DOCUMENT RESUME

ED 313 317 SO 020 666

AUTHOR	Allen, Russell; And Others
TITLE	The Geography Learning of High School Seniors.
INSTITUTION	Educational Testing Service, Princeton, N.J.; National Assessment of Educational Progress, Princeton, NJ.
SPONS AGENCY	National Center for Education Statistics (ED), Washington, DC.; National Geographic Society, Washington, DC.
REPORT NO	ISBN-0-88685-097-5; NAEP-19-G-01
PUB DATE	Feb 90
GRANT	G008720335
NOTE	140p.; "Prepared by Russell Allen, Norman Bettis, Dana Kaufman, Walter MacDonald, Ina V. S. Mullis, Christopher Salter, with the collaboration of Mary A. Foertsch, Lynn B. Jenkins, and Marianne Kenney." For related document, see SO 020 665.
AVAILABLE FROM	NAEP, Educational Testing Service, Rosedale Road, Princeton, NJ 08541-0001.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Educational Research; *Geographic Concepts; *Geography; Geography Instruction; Grade 12; History; *Map Skills; Secondary Education; Secondary School Curriculum; Social Studies; Statistical Analysis
IDENTIFIERS	*National Assessment of Educational Progress

ABSTRACT

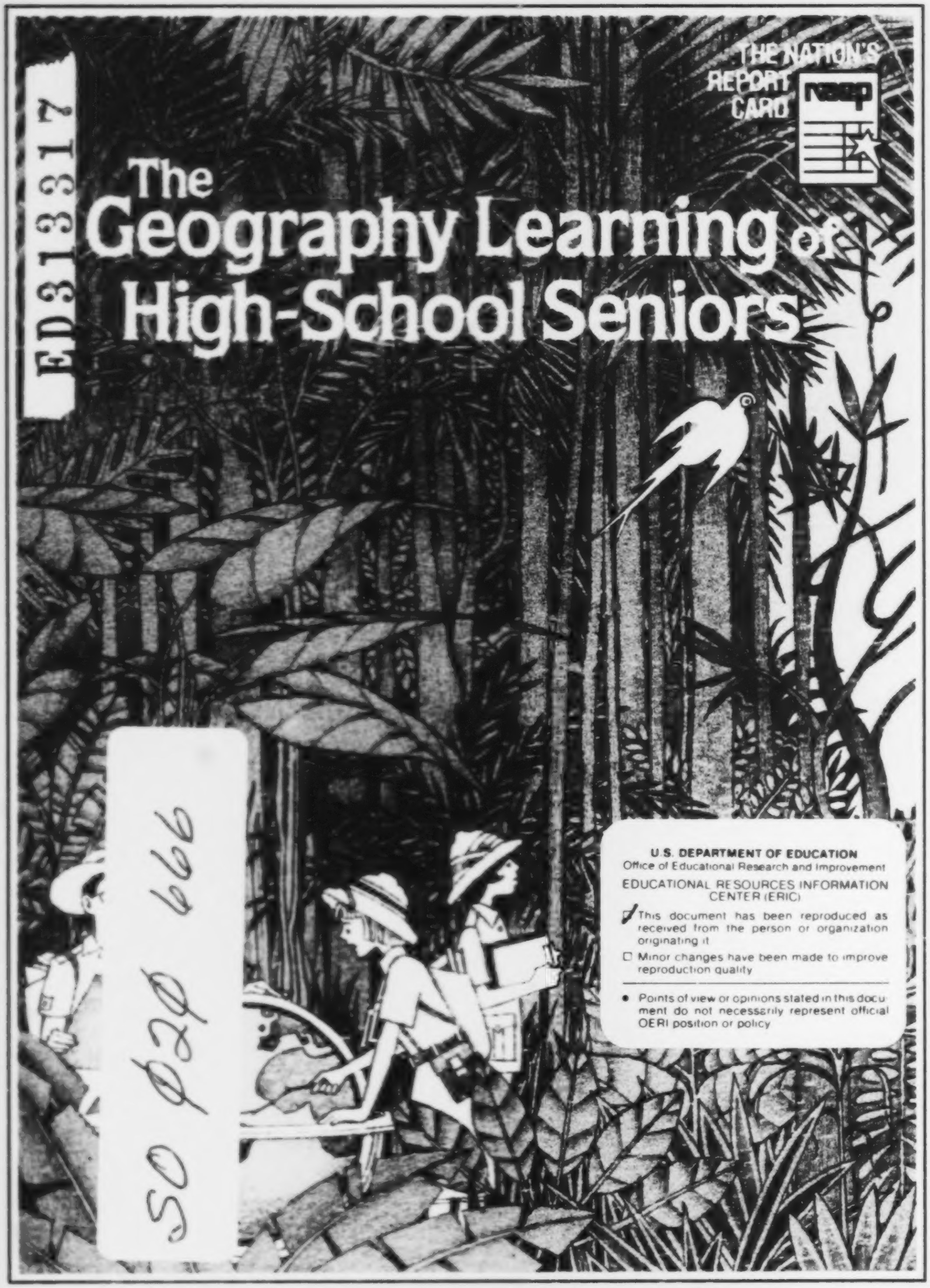
This report presents results of the 1988 National Assessment of Educational Progress (NAEP) survey of the geographic knowledge and skills of high school seniors. A national stratified sample of more than 3,000 twelfth graders from approximately 300 public and private schools responded to 76 multiple-choice questions about the following 4 topics in geography: (1) knowing locations, such as countries, cities, and physical places; (2) using the skills and tools of geography, such as map and globe symbols and longitude and latitude; (3) understanding cultural geography, including human-environment relationships and cultural change; and (4) understanding physical geography, including climate, weather, tectonics, and erosion. The respondents correctly answered only 57 percent of the test items. Average scores for the four topics in the test ranged from 52.5 percent correct on geographic skills to 59.5 percent correct in the cultural geography category. These results indicate that students generally are deficient in geographic knowledge and skills. This problem may be associated with inadequate treatment of geography in the high school curriculum. Much of the geography presented to high school students is integrated with courses in history and science. Less than two-thirds of these respondents had taken a high school course in geography. There was no relationship, however, between taking geography coursework and better performance on this test. But students who studied geography in a U.S. history course performed better than those without this academic experience. Better performance on this test was linked to certain background factors, such as well-educated parents, both parents living at home, availability of many reading materials, limited viewing of television, and time spent doing homework. Additional materials include reactions of researchers and educators, press release materials, and statements from officials of the Office of Educational Research and Improvement, the NAEP, and the National Geographic Society. (JP)

BEST COPY AVAILABLE

ED313317

THE NATION'S REPORT CARD naep

The Geography Learning of High-School Seniors



SO 020 666

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it

☐ Minor changes have been made to improve reproduction quality

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

Prepared by EDUCATIONAL TESTING SERVICE under a grant from THE NATIONAL CENTER FOR EDUCATION STATISTICS and the NATIONAL GEOGRAPHIC SOCIETY

OFFICE OF EDUCATIONAL RESEARCH AND IMPROVEMENT • U.S. DEPARTMENT OF EDUCATION

What is The Nation's Report Card?

The Nation's Report Card, the National Assessment of Educational Progress (NAEP), is the only nationally representative and continuing assessment of what America's students know and can do in various subject areas. Since 1969-70, assessments have been conducted periodically in reading, mathematics, science, writing, history/geography, and other fields. By making objective information on student performance available to policymakers at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement is collected under this program. NAEP guarantees the privacy of individual students and their families.

NAEP is a congressionally mandated project of the National Center for Education Statistics, the U.S. Department of Education. The Commissioner of Education Statistics is responsible, by law, for carrying out the NAEP project through competitive awards to qualified organizations. NAEP reports directly to the Commissioner, who is also responsible for providing continuing reviews, including validation studies and solicitation of public comment, on NAEP's conduct and usefulness.

In the 1988 Amendments, Congress created the National Assessment Governing Board (NAGB) to formulate policy guidelines for NAEP. The board is responsible for selecting the subject areas to be assessed, which may include adding to those specified by Congress; identifying appropriate achievement goals for each age and grade; developing assessment objectives; developing test specifications; designing the assessment methodology; developing guidelines and standards for data analysis and for reporting and disseminating results; developing standards and procedures for interstate, regional, and national comparisons; improving the form and use of the National Assessment; and ensuring that all items selected for use in the National Assessment are free from racial, cultural, gender, or regional bias.

The National Assessment Governing Board

Dr. Chester E. Finn, Jr., Chairman
Professor of Education and Public Policy
Vanderbilt University
Washington, D.C.

Honorable Wilhelmina Delco,
Vice-Chairman
Texas House of Representatives
Austin, Texas

Mrs. Phyllis Williamson Aldrich
Curriculum Coordinator
Saratoga Springs, New York

Ms. Francie Alexander
Associate Superintendent
California Department of Education
Sacramento, California

Mr. David Battini
High School History Teacher
Cairo, New York

Dr. Richard A. Boyd
Executive Director
Martha Holden Jennings Foundation
Cleveland, Ohio

Mr. Bruce E. Brombacher
Middle School Mathematics Teacher
Upper Arlington, Ohio

Honorable Michael N. Castle
Governor of Delaware
Wilmington, Delaware

Honorable Saul Cooperman
Commissioner of Education
New Jersey Department of Education
Trenton, New Jersey

Ms. Antonia Cortese
First Vice President
New York State United Teachers
Albany, New York

Mr. Christopher T. Cross, Ex Officio
Assistant Secretary
Office of Educational Research and
Improvement

Dr. Victor H. Ferry
Principal
Southwest School
Waterford, Connecticut

Mr. Michael S. Glode
Wyoming State Board of Education
Saratoga, Wyoming

Mr. Dale E. Graham
High School Principal (retired)
Columbia City, Indiana

Mr. Elton Jolly
President and Chief Executive Officer
OIC's of America
Philadelphia, Pennsylvania

Dr. Joseph B. Martin
Charlotte-Mecklenburg Board of Education
Charlotte, North Carolina

Dr. Carl J. Moser
Acting Director of Elementary and
Secondary Schools
Lutheran Church, Missouri Synod
Saint Louis, Missouri

Mr. Mark Musick
President
Southern Regional Education Board
Atlanta, Georgia

Honorable Carolyn Pollan
Arkansas House of Representatives
Fort Smith, Arkansas

Dr. Matthew W. Prophet, Jr.
Superintendent of Schools
Portland, Oregon

Dr. Dorothy K. Rich
President
Home and School Institute
Washington, D.C.

Honorable Richard W. Riley
Former Governor of South Carolina
Columbia, South Carolina

Mr. Thomas Topuzes
Executive Vice President
First International Bank
Chula Vista, California

Dr. Herbert J. Walberg
Professor of Education
University of Illinois
Chicago, Illinois

Dr. Roy Truby
Executive Director, NAGB
Washington, D.C.

The Geography Learning of High-School Seniors

Russell Allen • Norman Bettis • Dana Kurfman
Walter MacDonald • Ina V.S. Mullis • Christopher Salter

With the collaboration of
Mary A. Foertsch, Lynn B. Jenkins, and Marianne Kenney

FEBRUARY 1990

THE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

Prepared by EDUCATIONAL TESTING SERVICE under a grant
from THE NATIONAL CENTER FOR EDUCATION STATISTICS
and the NATIONAL GEOGRAPHIC SOCIETY

OFFICE OF EDUCATIONAL RESEARCH AND IMPROVEMENT • U.S. DEPARTMENT OF EDUCATION

U.S. Department of Education
Lauro F. Cavazos
Secretary

Office of Educational Research and Improvement
Christopher T. Cross
Assistant Secretary

National Center for Education Statistics
Emerson J. Elliott
Acting Commissioner

This report, No. 19-G-01, can be ordered from the National Assessment of Educational Progress, Educational Testing Service, Rosedale Road, Princeton, New Jersey 08541-0001.

Library of Congress Catalog Card Number: 89-64470

ISBN 0-88685-097-5

The 1987-88 geography assessment was made possible by special funding from the National Geographic Society and conducted in accordance with NAEP activities performed pursuant to Grant No. G-008720335 of the Office of Educational Research and Improvement. The contents of this booklet were reviewed by the National Geographic Society and by the Department of Education. However, these contents do not necessarily reflect the policy of the Department of Education, or endorsement by the Federal Government.

Educational Testing Service is an equal opportunity affirmative action employer.

Educational Testing Service, ETS, and ETS are registered trademarks of Educational Testing Service.

TABLE OF CONTENTS

CHAPTER ONE:
A Global Look at the Assessment Results 6
Are Students Learning Geography? 7
Geography Education in High Schools 9
Overview of the Assessment Content and Sample 11

CHAPTER TWO:
Knowing Locations 12
Locating Cultural Regions 14
Locating Countries 15
Locating Cities 16
Locating Physical Places 17
Locating Distributions of Climate and Natural Resources 18
Locating Distributions of Populations and Living Standards 20
Subgroup Performance 21
Relationship Between Locational Topics Studied and Performance on Locational Items 22
Summary 23

CHAPTER THREE:
Using the Skills and Tools of Geography 24
Understanding Latitude and Longitude 26
Understanding Projections 27
Recognizing and Interpreting Map and Globe Symbols 28
Reading and Interpreting Graphs and Charts 29
Recognizing and Interpreting Thematic Maps 29
Subgroup Performance 29
Relationship Between Geography Skills Studied and Performance on Skills Items 30
Summary 31

CHAPTER FOUR:
Understanding Cultural Geography 32
Human Impact on the Environment 34
Cultural Change 35
Economic Factors 37
Urban Population 38
Subgroup Performance 39
Relationship Between Cultural Geography Topics Studied and Performance on Cultural Geography Items 39
Summary 40

CHAPTER FIVE: **Understanding Physical Geography** 42
Tectonics and Erosion 43
Climate and Weather 44
Subgroup Performance 46
Relationship Between Physical Geography Topics Studied and Performance on Physical Geography Items 47
Summary 48

CHAPTER SIX: **Geography Studies in High School** 49
Study of Geography Topics 49
Geography Courses Taken 51
Geography Studies in Related Courses 53
Summary 56

CHAPTER SEVEN: **Differences in Geographic Proficiency for Subpopulations** 57
Demographic Subgroups 57
Home Influences 59
Television, Homework, and Part-time Work 60
Summary 62

Procedural Appendix 63

Data Appendix 71

1

A Global Look At The Assessment Results

The study of geography is multifaceted, encompassing not only knowledge of the physical characteristics of the planet Earth — such as its topography and climate — but also the multiple relationships between people and their environment. Geography education spans a variety of content and skill areas, providing instruction in map and globe skills, knowledge of themes in physical and cultural geography, and examinations of the interrelationships among various geographic and social factors, for example, exploration, migration, the cultural landscape, and demographic characteristics. There is very little information, however, concerning what students actually know about geography, particularly in areas that go beyond their ability to locate certain countries, cities, or landscape features.

This report from The Nation's Report Card, the National Assessment of Educational Progress (NAEP), provides detailed information on the geographic understandings of high-school seniors. Initiated and supported by the National Geographic Society, the 1988 NAEP geography assessment included a range of questions about geographic locations; the tools of geography, including maps and globes; and concepts central to understanding physical and cultural geography.

In addition to the cognitive questions, the assessment included two background questionnaires — one asking students to provide basic demographic data and the other requesting information on their high-school studies in geography. More than 3,000 twelfth-grade students from approximately 300 public and private schools across the nation participated in the study, which was conducted from January through May of the 1987-88 school year. It will be referred to as the 1988 geography assessment throughout the remainder of this report.

Are Students Learning Geography?

The findings from the 1988 NAEP assessment suggest that our country's high-school seniors are not well versed in geography. Most students did not demonstrate an understanding of the basic concepts of physical and cultural geography, and many did not correctly identify the location of major countries, cities, and landmarks. Further, many of the students did not seem to understand that maps can be used to derive all kinds of information about the world, rather than simply to find places.

The following highlights of the NAEP survey results describe the areas in which students fared best and those in which they displayed critical shortcomings.

- Most of the high-school seniors correctly answered questions about the location of major countries. For example, 87 percent identified Canada on a world map, and 85 percent recognized the Soviet Union.

- Twelfth graders did not perform as well when asked to identify other places such as cities and physical land features. Only 58 percent located Jerusalem on a regional map, and 42 percent identified Nigeria on a map of Africa. Just 36 percent said that Saudi Arabia borders on the Persian Gulf and Red Sea. Only slightly more than half the students located the Andes Mountains on a map of South America, and slightly less than half seemed to know that the Amazon River is not in Argentina.

- Students performed relatively well on questions about events and locations featured in the news. Three-fourths of the students demonstrated that they were aware that the United States is a major exporter of grain, and 71 percent successfully located Latin America on a world map. An even higher percentage of the students (84 percent) correctly identified countries in the Middle East.

- Most twelfth graders demonstrated their awareness of environmental issues addressed in the news by correctly answering questions on the control of acid rain (79 percent) and pollution from pesticides (69 percent). However, fewer students appeared to understand these issues in depth: 59 percent recognized the consequences of cutting down the rain forests, 53 percent identified a cause of the greenhouse effect, half appeared to know an effect of the melting polar ice caps, and 41 percent recognized an effect of thermonuclear war on the environment.

- In response to questions concerning weather and climate, most students appeared to know that it is cold and tundralike in the polar regions (74 percent), but fewer seemed to know that hot and desertlike places exist in tropical regions (60 percent). Approximately two-thirds of the students correctly reported that the climate would change from cold to hot as a traveler moved away from the northern latitudes toward the equator. Less than one-third appeared to know that rapidly rising atmospheric pressure usually indicates dry and sunny weather.

- In response to questions concerning the distribution of the world's natural resources, many more students recognized the countries with oil (72 percent) than areas of the United States with coal (48 percent). About one-quarter (23 percent) incorrectly said that a map displaying areas of high population density showed abundant mineral resources.

- Less than two-thirds of the students demonstrated that they were familiar with the concepts of latitude and longitude: 62 percent successfully located a site at a particular latitude and longitude, 58 percent identified cities on a map with similar longitude, and 55 percent correctly defined zero degrees longitude as the prime meridian (although nearly one-third thought it was the equator).

- Students seemed to understand the basics of map reading, but had difficulty interpreting information given on a single map and integrating the information presented across multiple maps. For example, relatively few students were able to use specialized maps to identify areas with similar living standards (35 percent) or areas likely to have soil erosion (27 percent).

Geography Education in High Schools

Given the limited understanding of geography displayed by so many students approaching high-school graduation, it is important to know whether students have had an opportunity to study the subject in depth. Accordingly, NAEP asked twelfth graders participating in the 1988 geography assessment to provide information on their enrollment in high-school courses in geography and related subjects and on the extent to which they had studied topics covered in the assessment.

- The percentage of students who reported taking a geography course in high school (or planning to take a course) became smaller with each increase in grade level. In a recent survey conducted by the Council of Chief State School Officers (CCSSO), only 18 percent of the states reported that they required students to take a geography course before they graduated from high school.[1] Altogether, less than two-thirds of the twelfth-grade students participating in the 1988 NAEP assessment reported taking a geography course at any grade in high school.

- Geography course-taking *per se* was not related to better performance on the assessment, for the nation or for most of the subpopulations studied.

---

[1] Council of Chief State School Officers, *Geography Education and the States* (Washington, DC: Council of Chief State School Officers, 1988).

- Much of the geography that is presented in the high-school curriculum seems to occur as part of other courses. For example, students reported studying geography as part of their ninth-grade science classes, their tenth-grade world history classes, and their eleventh-grade U.S. history classes. These findings agree with the results of the CCSSO survey, in which 40 percent or more of the states indicated that geography constituted at least one-tenth of both their world history and U.S. history courses.[2] Students who reported studying geography as part of their U.S. history classes performed better on the assessment than those who did not, but there was no difference in geographic proficiency between students who reported geography studies in other subjects such as world history and science and those who did not.

- When asked how much they studied particular geography topics in any high-school course, approximately one-third (32 percent) of the twelfth graders reported "a lot" of study of the topics covered in the assessment, slightly more than half reported some study, and 14 percent reported little study of any of the topics. Nearly half (47 percent) of the students reported they had studied the location of states and cities "a lot," while one-third reported this much emphasis on the study of foreign countries. Approximately one-fifth of the students reported studying geography skills — such as reading the symbols on maps and globes and using scales to measure distance — "a lot," while only 7 percent reported studying cultural geography to this extent. Students who reported more study of locations and physical geography topics and of geography skills tended to perform better in those areas of the assessment.

---

[2] Ibid.

In summary, the assessment results indicate that students generally have a weak understanding of geography, and that the amount of geography instruction provided across the high-school grades is quite low. When it is taught, it appears that geography is often integrated into other courses, such as history, social studies, and science.

Overview of the Assessment Content and Sample

The objectives for NAEP's 1988 geography assessment reflected a broad-based consensus of university professors, classroom teachers, social science researchers, school administrators, and curriculum specialists. In brief, the assessment framework emphasized that students should be able to use the skills and tools of geography, including maps, charts, and globes; that they should know and understand the concepts underlying cultural and physical geography, including the location of places, resources, and cultural areas; and that they should be able to apply geographic principles.

The assessment consisted of 76 multiple-choice questions covering a broad range of topics in geography, including humans' interactions with the Earth's resources and environment and the ways in which these interactions relate to various historical, political, cultural, and economic phenomena. Though broader coverage would have been desirable, resource limitations precluded in-depth investigation of each of the numerous topics comprising geographic literacy. However, the assessment was designed to tap many critical skills and understandings, and the results offer a foundation for further study.

The 1988 NAEP geography assessment was part of a biennial effort which in 1988 involved approximately 1,500 schools and 130,000 elementary-, middle-, and high-school students. As with all NAEP assessments, the 1988 assessment was based on a deeply stratified, three-stage student sampling design. The questions were assembled and administered to students according to a complex matrix procedure so that each student responded to a subset of the items in the assessment. This enabled coverage of a wide variety of subject and topic areas while limiting the time burden for any one student to about one hour. All data were collected by trained field staff under strictly controlled conditions.

2

Knowing Locations

Although geographic concerns are much broader and more far-reaching than knowing locations, there is little question that the ability to locate places is an important indicator of geographic knowledge. Thus, a portion of the 1988 NAEP geography assessment focused on students' locational knowledge, such as their ability to locate key physical and cultural features of the world and to understand how they relate to patterns of climate, population, and economic development.

Students performed best on locational questions that asked them to use a world map to find just one place, such as Canada, the Soviet Union, or Latin America. More than 70 percent of the students could locate these particular areas. Given the importance of place location, however, student performance in this area was lower than might be anticipated. An average of 57 percent of the students gave correct responses to the locational questions overall. The percentage of high-school seniors responding correctly to each of the 24 locational questions included in the assessment is presented in TABLE 2.1.

The relatively low performance on locational geography questions is puzzling in light of the fact that students in the NAEP sample reported that this aspect of geography received major emphasis in their high-school history and geography courses. When asked how much they had studied particular topics in geography, 83 percent of the students indicated they had studied the location of continents, oceans, rivers, mountains, states, cities, countries, and cultures "a lot" or "some." No other group of topics reportedly received this much attention.

TABLE
2.1

Knowledge of Locations

	Percent Correct
Locate Canada on a world map	87
Locate the Soviet Union on a world map	85
Identify countries in the Middle East from a series of lists	84
Identify cold, dry, tundralike regions on a world map	74
Identify petroleum exporting countries on a world map	72
Locate Latin America on a world map	71
Identify climate types comparing northern Europe and Saudi Arabia	68
Know that the Mississippi River flows into the Gulf of Mexico	67
Identify the locational order of four U.S. West coast cities	64
Identify hot, dry, desertlike regions on a world map	60
Locate the Pacific Ocean relative to South America	59
Locate Jerusalem on a regional map	58
Locate the Andes Mountains on a map of South America	53
Identify Canada and Australia as having similar population densities	52
Identify a population distribution on an Eastern hemisphere map	51
Know that the Panama Canal reduced sailing time from New York to San Francisco	50
Identify a distribution of coal deposits on a U.S. map	48
Identify an incorrect pairing of countries and their major rivers	46
Identify the locational order of four U.S. East coast cities	43
Locate Nigeria on a map of Africa	42
Locate Southeast Asia on a world map	37
Know that Saudi Arabia is bounded by the Red Sea and the Persian Gulf	36
Identify Japan as the country most like Canada in living standards	35
Identify the order of the oceans, moving west to east from Africa	33

To focus the discussion of locational knowledge, the assessment questions in this area have been classified as measures of students' knowledge of 1) cultural regions, 2) countries, 3) cities, 4) physical places, 5) world distributions of climate and resources, and 6) world distributions of population and living standards. The following sections discuss student performance in each of these areas. As might be expected, the NAEP results show considerable variation in students' locational knowledge.

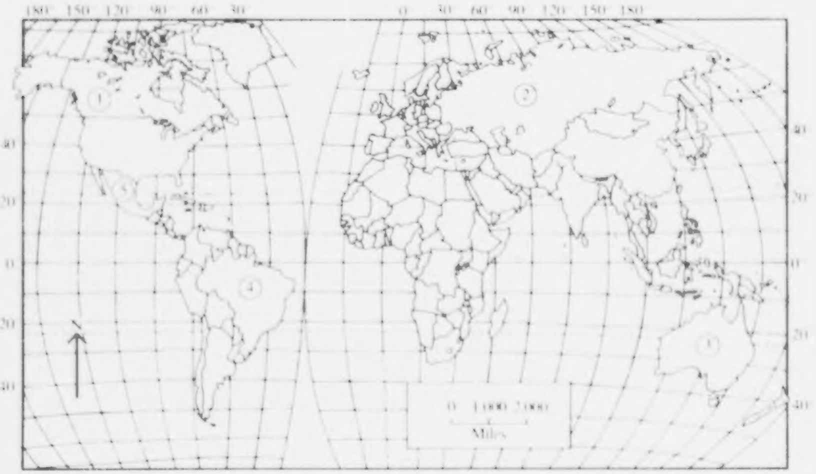
Locating Cultural Regions

Geographers frequently organize the world for educational purposes in terms of cultural regions, such as "Western Europe" and "Latin America." From the assessment results, it appears that twelfth-grade students were more familiar with some of these regions than with others. At the extremes, 84 percent of the seniors could identify a list of countries in the Middle East, but only 37 percent were able to locate Southeast Asia on a world map. The high percentage of students who gave incorrect answers to the latter item may be viewed as surprising, given the recent U.S. involvement in Southeast Asia and this region's growing importance in world affairs. More than one-third (37 percent) of the students incorrectly responded that India is part of Southeast Asia, while much smaller percentages said that either Saudi Arabia (13 percent) or Brazil (13 percent) are part of this cultural region.

In response to a question on Latin America, presented below, 71 percent of the students gave the correct answer. Fifteen percent of the students mistakenly identified the area as sub-Saharan Africa, suggesting that some were unable to distinguish Africa from South America.

Locating Countries

Most of the students assessed were able to locate major foreign countries such as Canada and the Soviet Union; locational questions on these two countries were answered correctly by 87 percent and 85 percent of the students, respectively. The question concerning the location of Canada follows the question on Latin America.


180
150
120
90
60
30
0
30
60
90
120
150
180
40
20
0
20
40
1
2
3
4
5
0 1,000 2,000
Miles

The area marked 4 on the map is located in which of the following cultural regions?

A The Middle East

B Sub Saharan Africa

C Eastern Europe

[✓ **D**] Latin America

Canada is identified by which of the following numbers on the map?

[✓ **A**] 1

B 2

C 3

D 5

Less than half the students (42 percent) appeared to be familiar with the location of Nigeria — Africa's most populous country and a major exporter of oil. Even fewer (36 percent) correctly answered a question about Saudi Arabia which did not reference a map, but instead asked students to identify the country bounded by the Red Sea and the Persian Gulf.

Locating Cities

Although students had some success in locating countries and cultural regions, they were less likely to demonstrate a knowledge of city locations. This may be partly explained by a lack of instructional emphasis on this topic area; most students indicated that they studied very little about cities in their geography courses.

Sixty-four percent of the students answered the following item correctly.

Which of the following is the north-to-south sequence of major cities on the west coast of the United States?

A Los Angeles, San Francisco, Seattle, Portland
B Portland, Los Angeles, Seattle, San Francisco
C San Francisco, Portland, Seattle, Los Angeles
[✓ D] Seattle, Portland, San Francisco, Los Angeles

As might be expected, students in the West performed better on this question than did students in other regions of the country.

Students appeared to have greater difficulty with questions that required them to combine a knowledge of city locations with a knowledge of foreign landmarks. For example, only half of the high-school seniors were able to answer the following question correctly.

The construction of the Panama Canal shortened the sailing time between New York and

A London
B Port-au-Prince
C Rio de Janeiro
[✓ D] San Francisco

One-fifth of the students indicated that the canal shortened sailing time from New York to Rio de Janeiro, 16 percent from New York to London, and 13 percent from New York to Port-au-Prince.

Other locational questions of this sort — asking students to provide relational information — resulted in lower performance levels for students than questions asking them to simply locate a single place on a map.

Locating Physical Places

Knowledge of physical places includes the ability to find the world's great oceans, mountains, and rivers on a map and to determine their relative location without a map. In one question referring to a regional map, 59 percent of the students correctly identified the ocean west of the South American continent.

Another question asked students to identify the proper order in which the three oceans along the equator appear from west to east, starting in Africa. Like the questions on the sequential location of cities mentioned earlier, this proved very difficult for students; only one-third chose the correct order.

With respect to river locations, students performed better on a question about the Mississippi River than on a question requiring them to identify a mismatch among four major rivers and their countries. Only 46 percent responded correctly to the latter question, while 67 percent correctly indicated that the Mississippi River flows into the Gulf of Mexico. The Mississippi River question follows.

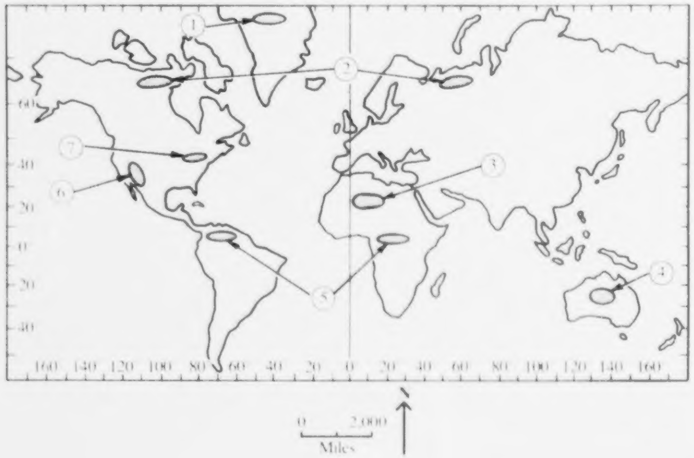
The Mississippi River flows into the

Ⓐ Gulf of Mexico
B Great Lakes
C Atlantic Ocean
D Pacific Ocean

Almost 15 percent of the students indicated that the Mississippi River flowed into the Atlantic Ocean, and more than 10 percent said that it flowed into the Great Lakes. Students from the Central part of the country did perform better on this question than students from other regions.

Locating Distributions of Climate and Natural Resources

Students more often were able to locate world climate and natural resource patterns than particular physical or cultural places on the earth. The following question illustrates the format of most of the assessment questions on world climatic patterns.


1
2
3
4
5
6
7
60
40
20
0
20
40
160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160
0 2,000
Miles
N

Which of the following regions are hot, have little precipitation, and are desertlike?

A 1 and 2

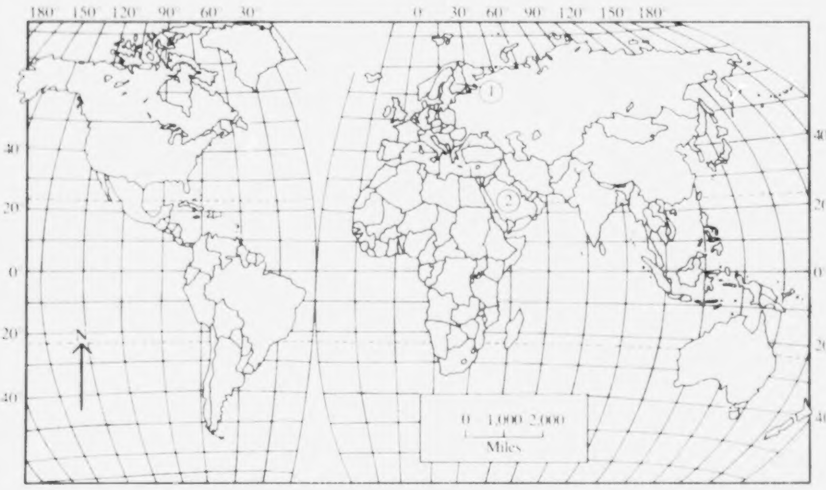
[✓ **B**] 3 and 6

C 4 and 5

D 5 and 7

Sixty percent of the students chose the correct answer, identifying the similar desertlike areas of North Africa and the western part of the United States. Another 28 percent of the students assessed chose the third option, which includes just one desertlike area.

The following climate question was answered correctly by approximately two-thirds (68 percent) of the students.



A traveler going from Nation 1 to Nation 2, shown on the map above, would experience a climatic change from

[✓ A] humid cold to desert

B humid subtropical to Mediterranean

C desert to tropical rain forest

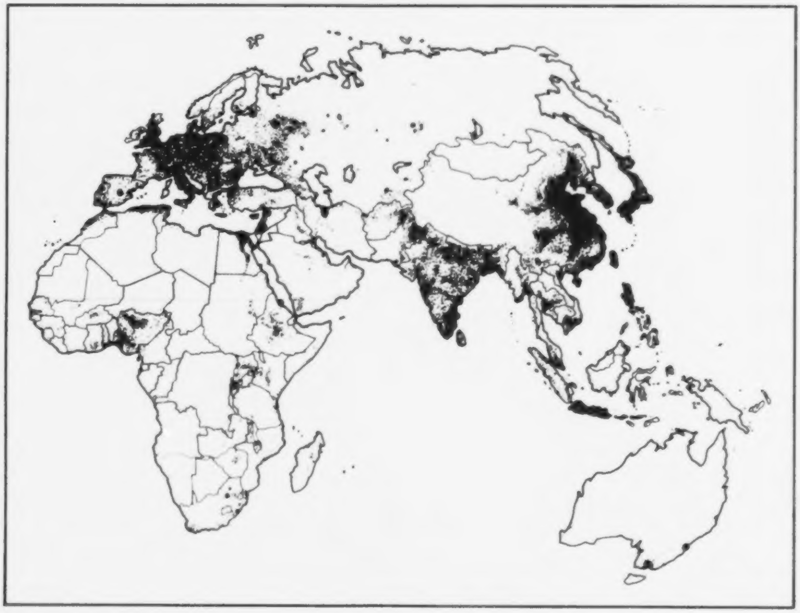
D tropical wet and dry to Mediterranean

Although a moderately high proportion of the students correctly identified a cold part of the world, as well as a desert area of the Middle East, nearly one-third (32 percent) incorrectly said the climate was either tropical or desertlike at the northern latitudes.

Based on a world map, 72 percent of the high-school seniors identified the countries that were major exporters of oil. However, less than half (48 percent) correctly identified the areas of major coal deposits on a map of the United States.

Locating Distributions of Populations and Living Standards

Students performed least well on locational questions pertaining to world distributions of populations and living standards. Slightly more than half the students recognized, from a map of the world, that the population density of Australia is most like that of Canada. And only 35 percent recognized that Japan is most like Canada in its standard of living. In response to the question below, designed to measure students' "mental map" of population distribution, approximately half (51 percent) recognized that the map represented population concentrations, while 23 percent incorrectly stated that it showed mineral deposits.



The dots and shadings on the map above indicate areas with

[✓ A] population concentrations

B intensive agriculture

C industrial development

D abundant mineral deposits

Subgroup Performance

In examining the proportions of correct responses to the locational items for various demographic subgroups — in particular, groups defined by gender, race/ethnicity, and region — considerable differences in students' performance are evident.[3] On average, 61 percent of the White students, 47 percent of the Hispanic students, and 41 percent of the Black students answered these items correctly.

Although the performance of White, Black, and Hispanic students varied from item to item, no consistent themes were evident in the types of items that presented the most or the least difficulty to minority students. These twelfth graders performed least well on the locational items that asked them to identify the order of four cities from north to south along the west coast of the United States, to interpret a population density map, and to identify the final destination of the Mississippi River.

Males performed better than females on most of the locational items, and as a result, the average percentage of males who gave correct responses across the entire set of items was 11 points higher than that of females (63 percent correct for males and 52 percent for females). The gender performance gap appeared to be greatest on items that involved the ability to locate and interpret information on cultural areas — for example, questions that addressed the impact of the Panama Canal, the comparison of living standards between Canada and Japan, and the graphic representation of population density.

The performance of high-school seniors in the Southeast trailed behind that of their counterparts in the other three regions of the country. Students in the Northeast, Central, and West averaged 58 to 59 percent correct across the locational questions, while those in the Southeast averaged 52 percent correct.

---

[3] More detailed information on performance results for various population subgroups can be found in the Data Appendix.

Relationship Between Locational Topics Studied and Performance on Locational Items

An analysis of students' performance on the 24 locational items overall, in light of their reported studies in this topic area, yielded some interesting findings. These data are summarized in TABLE 2.2.

TABLE
2.2

Average Performance on Locational Items by Extent of Studies of Geographic Locations

Extent Studied	Percent of Students	Average Percent of Correct Responses
None or Very Little	17 (1.3)	54 (1.7)*
Some	54 (1.5)	57 (0.8)*
A Lot	29 (1.6)	63 (1.4)

*Statistically significant difference from "a lot" group at the .05 level.
Standard errors are presented in parentheses.
Note: The "average percent correct" figure refers to locational items only.

Slightly more than half the students (54 percent) reported that they had studied the location of continents, countries, states, cities, and various places to some extent. Far fewer students — only 29 percent — reported studying locational topics more extensively. As could be expected, these students tended to perform better on the locational items than students who had studied these topics less.

Summary

Students appeared to have difficulty with many of the locational questions, despite the fact that 83 percent of them reported studying locational information either "some" or "a lot." On average, only 57 percent of the students responded correctly to the locational questions in the assessment.

Most of the high-school seniors were able to locate major foreign countries such as Canada and the Soviet Union and cultural regions such as the Middle East and Latin America. However, they had more difficulty locating cities and physical places. For example, just one-third identified the correct order in which the three oceans along the equator appear from west to east, starting in Africa.

High-school seniors did not appear familiar with distributions of natural resources, population, or climate — factors that influence global economic patterns. For example, less than one-half identified the areas of major coal deposits on a map of the U.S. and nearly one-quarter confused population concentrations with mineral deposits on a world map.

These results indicate that many students approaching high-school graduation lack an understanding of the location of important cultural regions, countries, cities, physical places, and climatic regions, as well as population distributions and living standards — and of the interrelationships among these elements.

3

Using the Skills and Tools of Geography

The skills and tools essential to the study of geography range from the elementary to the more advanced — from reading a map for general information to understanding distributional patterns; recognizing the purposes of different symbolic representations; and interpreting thematic maps, graphs, and photographs.

Among the questions that the 1988 NAEP geography assessment sought to answer are the following: Are students able to recognize and interpret map and globe symbols? Can students use coordinates of latitude and longitude to determine absolute location? Can students use a map to gain basic information and to reach conclusions about areas? Can students detect patterns and determine relationships across maps? Do students understand that any flat map is a distortion of the Earth's curved surface and that different map projections serve different purposes? Are students able to read and interpret graphs and charts?

TABLE 3.1 presents the percentages of students who responded correctly to the assessment questions measuring the ability to use geographic skills and tools. The percentage of students providing correct responses exceeded 65 percent on only two questions, and on four other items, the proportion was 35 percent or lower.

TABLE
3.1

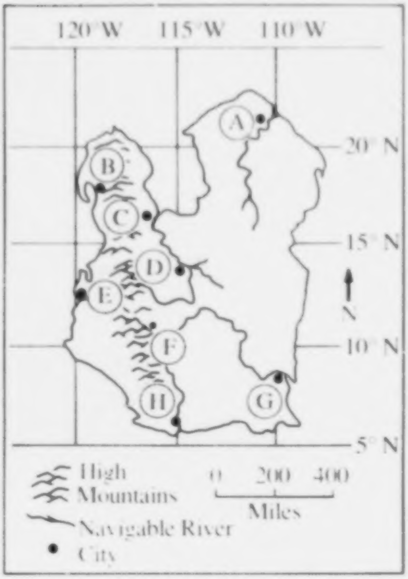
Ability to Use Geography Skills and Tools

	Percent Correct
Use a map to compare two countries	78
Identify type of country shown on population pyramid	70
Identify information shown/not shown on a map	65
Identify information shown on a cartogram	65
Identify latitude and longitude of a place on a map	62
Identify cross section shown on a contour map	60
Identify two cities with similar longitude on a map	58
Identify appropriate map for navigation	56
Use information on a map to select a site for industry	56
Identify correct orientation of U.S. state	55
Identify the prime meridian	55
Use a map to identify a likely type of land formation	48
Identify an area shown on a graph with climatic data	45
Recognize areas distorted on a specific projection	35
Interpret a graph showing birth and death rates	29
Recognize how a projection tries to reduce distortion	29
Use a map to identify a likely area of soil erosion	27

Understanding Latitude and Longitude

Although students performed slightly better on three items measuring their understanding of latitude and longitude than on other questions in the skills domain, less than two-thirds of the high-school seniors answered these questions correctly. While an average of 53 percent of the students responded correctly to the skills items overall, from 55 to 62 percent of the students responded correctly to specific questions requiring a grasp of latitude and longitude.

For example, 58 percent of the students selected the correct answer to the item shown below, requiring students to use a map to identify two cities at similar longitudes. However, nearly 20 percent chose the cities at the same latitude (option D), suggesting a confusion between the concepts of latitude and longitude.



Which of the following cities have similar longitude?

A C and D

B D and E

[✓ **C**] D and H

D G and H

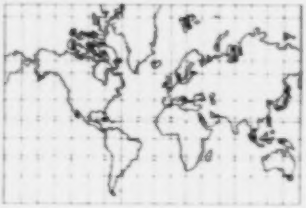
Understanding Projections

Of all the skills questions, students performed least well on items measuring their understanding of the features of various map projections. The best performance was on the item presented below, in which students were asked to select the most useful map for ocean navigation. Fifty-six percent correctly chose the Mercator Projection. Although only 9 percent of the students chose the Sinusoidal Projection, 18 percent selected the Mollweide Homolographic Projection and 17 percent chose the Robinson Projection, perhaps because the latter two have the approximate shape of a globe or sphere.

Two other items on map projections, both on the concept of distortion, were answered correctly by only 35 percent and 29 percent of the students, respectively.

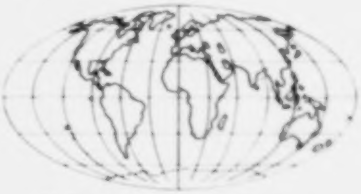
Which of the following map projections would be most useful for ocean navigation?

[✓ A]



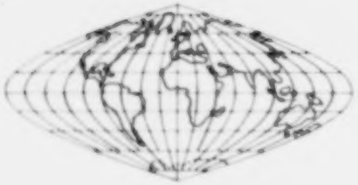
Mercator Projection

B



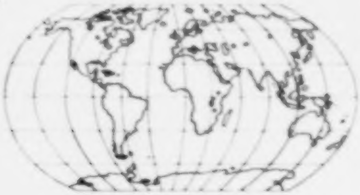
Mollweide Homolographic Projection

C



Sinusoidal Projection

D

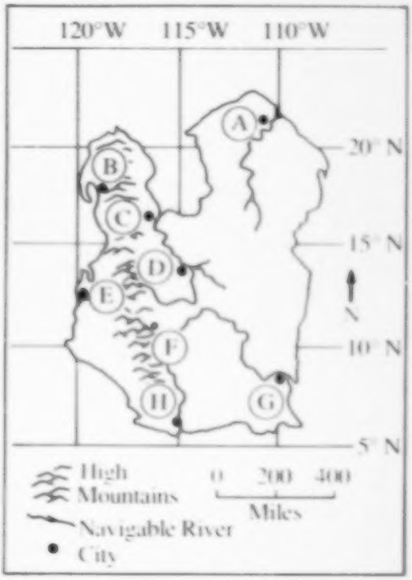


Robinson Projection

Recognizing and Interpreting Map and Globe Symbols

Performance in this area varied considerably, but most students responded correctly to two items measuring their ability to recognize and interpret map and globe symbols. The item answered correctly by the highest percentage of students (78 percent) was based on a map in which one country was superimposed on another, and students were asked to interpret symbols to compare the two countries. In another item, which approximately two-thirds of the students answered correctly, they were given a polar projection and asked to indicate what the map showed.

Students performed less well on the item shown below, which required them to select the most probable land formation at a location on the map.



Which of the following land formations would most likely be found near city A?

A A plateau

B A volcano

[✓ C] A delta

D A peninsula

Slightly less than one-half of the students (48 percent) recognized that "a delta" was the correct answer. Among the incorrect responses, "a plateau" was selected by 24 percent of the students, "a volcano" by 7 percent, and "a peninsula" by 19 percent. These response patterns suggest that students had difficulty interpreting and making inferences based on data presented in maps or that they did not know the definitions of the terms presented in the question.

Reading and Interpreting Graphs and Charts

Students had mixed success with the items designed to measure their ability to read and interpret geographic information presented in graphs and charts. For example, 70 percent of the high-school seniors were able to identify the type of society depicted by the data in a population pyramid. However, when presented with a graph showing birth and death rates in a country over a period of time, only 29 percent were able to select a corresponding graph that displayed the country's change in population over the same time period.

Recognizing and Interpreting Thematic Maps

The remaining item in the skills category measured students' ability to recognize and interpret thematic maps. Students were presented with a shaded map and asked to indicate what the shading represented; slightly less than two-thirds of the students (65 percent) were able to do so.

Subgroup Performance

In comparing the performance of various demographic subgroups on the skills items, several interesting differences are apparent. On average, 56 percent of the White students answered the skills questions correctly, whereas Hispanic students and Black students averaged 43 percent and 38 percent correct, respectively. On average, males scored 7 percent higher than females (56 percent correct for males compared with 49 percent for females). Twelfth graders in the Northeast, Central region, and West averaged 53 to 54 percent correct, whereas those in the Southeast averaged 49 percent correct.

Relationship Between Geography Skills Studied and Performance on Skills Items

The NAEP geography assessment asked students to indicate how much they had studied three types of skills and tools: reading symbols on maps and globes, using scales to measure distance, and using latitude and longitude. As shown in TABLE 3.2, on average, approximately one-fifth of the students answered "a lot" across these three questions, while 28 percent answered "very little" or "not at all." Slightly more than half of the students (53 percent) responded that they had studied these topics "some."

TABLE

3.2

Average Performance on Skills Items by Extent of Studies of Geographic Skills and Tools

Extent Studied	Percent of Students	Average Percent of Correct Responses
None or Very Little	28 (1.6)	49 (1.1)*
Some	53 (1.4)	53 (0.9)*
A Lot	19 (1.2)	58 (1.4)

*Statistically significant difference from "a lot" group at the .05 level. Standard errors are presented in parentheses.

Note: The "average percent correct" figure refers to skills and tools items only.

A comparison of responses to these questions with performance on the skills items overall indicates that students who had studied geographic skills and tools the most tended to do the best on the skills-related items. Conversely, students who reported very limited or no study of geographic skills and tools averaged less than 50 percent correct responses on these items.

Summary

The abilities to recognize and interpret map and globe symbols, use scales to measure distance and areas, and determine the absolute location of a place using latitude and longitude are important elements of geographic proficiency. Further, a full repertoire of geography skills includes a grasp of important concepts such as region and relative location, recognition of the types and purposes of various projections, and the detection of patterns and relationships across these projections.

Unfortunately, student performance in the 1988 assessment fell short of these ideals. In general, it appears that many high-school seniors have not mastered such simple concepts as longitude and latitude. Even fewer were able to interpret geographic data represented in graphs and charts, or to use one or more maps to detect patterns or compare and contrast information.

Students' responses to questions asking about the extent to which they had studied various geographic topics showed that almost three-quarters (72 percent) had "some" or "a lot" of exposure to maps, globes, and other geography tools, while 28 percent had little or no exposure.

4

Understanding Cultural Geography

Students' understanding of key concepts and principles in cultural geography is an important part of their geographic proficiency as a whole. Are students aware of the ways in which humans transform the environment and, in turn, are affected by the environment? Are they knowledgeable about the consequences of spatial interactions between people and places on earth? For example, do they understand how changes in technology, such as the use of satellite dishes in remote locations, affect people and places and contribute to the creation of new physical and cultural landscapes?

The high-school students assessed in 1988 demonstrated at least a partial understanding of some cultural concepts. These included the impact of human life on the environment, the impact of isolation or interaction on cultural change, economic factors such as the role of exports in the national economy, and factors influencing population distribution. However, students showed relatively limited understanding of cultural concepts that relate to such topics as the causes of the greenhouse effect, the influence of urban areas on the physical environment, and the ecological impact of thermonuclear war, as well as such economic issues as the conditions that influence employment, the growth of developing nations, and trading of industrial products.

The set of 23 cultural geography items included in the assessment is presented in TABLE 4.1, with the percentage of students who answered each question correctly. On average, 60 percent of the high-school seniors gave correct responses to these questions.

TABLE
4.1

Understanding of Cultural Geography

	Percent Correct
Prevention of acid rain	79
U.S. net exporter of grain	75
Impact of isolation on cultural change	74
Essentials for industrialization	70
Impact of chemicals on pollution	69
Factors influencing economic development of Japan	69
Factors influencing cultural change	68
Factors affecting trade relations between the U.S. and Cuba	68
Urban land use terminology	67
Changes in Midwest vegetation cover	65
Factors influencing business location	64
Factors influencing population distribution	62
Traffic flow in urban areas	61
Impact of vegetation removal	59
Factors influencing employment	55
Impact of technological developments on U.S. agriculture	54
Economic growth in developing countries	54
Causes of the greenhouse effect	53
Impact of urban areas on physical environment	49
Cultural diffusion	41
Environmental impact of thermonuclear war	41
Boundaries of present-day African nations	36
World trade of industrial products	35

Human Impact on the Environment

Seven questions measured students' knowledge and conceptual understanding of the impact that humans have on their environment. As with the other areas of the assessment, high-school seniors showed mixed success; the percentage of students providing correct responses to these items ranged from 41 to 79 percent. One item, presented below, was designed to measure students' understanding of the historical changes that led to the current appearance of the Midwestern landscape.

Large parts of the American Midwest were covered almost entirely by forests 150 years ago.

Today the forest areas are much smaller. Which of the following is most responsible for this change?

A A decrease in average temperature
B An increase in average precipitation
C An increase in the number of forest fires
[✓ D] The growth of farming

Sixty-five percent of the students answered this item correctly. Of the remaining 35 percent, 20 percent chose "an increase in the number of forest fires." These students may have shown some degree of understanding by associating forest fires with the destruction of forests.

The following item was designed to assess students' understanding of one way urban development can affect the environment. However, only 49 percent of the twelfth graders correctly indicated that the temperature would decrease as one went from a densely populated urban area to the countryside.

As one goes from the center of an inland metropolitan area to the countryside, what happens to the temperature?

A It increases
[✓ B] It decreases
C It changes unpredictably
D It remains the same

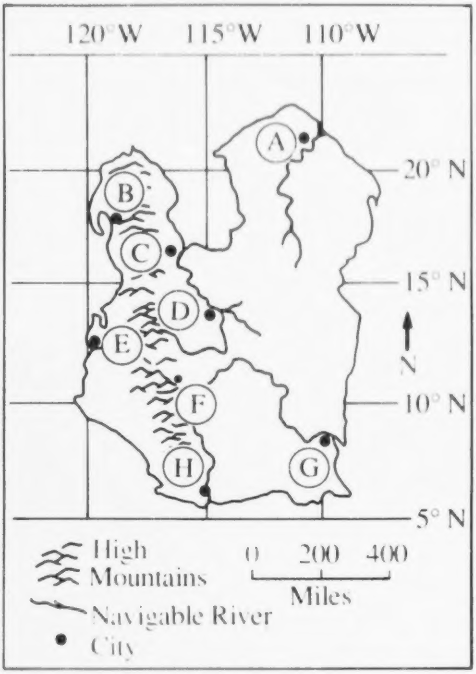
Students demonstrated some familiarity with environmental issues highlighted in the media. For example, 79 percent responded correctly to the question about preventing acid rain and 69 percent to the question about chemical pollution.

However, given the recent attention to these topics, disappointing proportions of high-school seniors responded correctly to questions addressing the consequences of rain-forest vegetation removal (59 percent correct) and the causes of the greenhouse effect (53 percent correct). More than one-fifth incorrectly reported that removal of vegetation would increase wildlife populations, and a similar proportion attributed the greenhouse effect to increased incidence of solar flares on the Sun's surface. Of the environmental questions asked, twelfth graders performed least well on a question about the environmental impact of thermonuclear warfare (41 percent).

Cultural Change

Three items were used to assess students' understanding of the factors that relate to cultural change, and performance on these items ranged from 41 percent correct to 74 percent correct. For example, 68 percent of the high-school seniors were successful on the following item, which asked them to make inferences about cultural change based on information presented in a map and accompanying text. In addition to those who correctly indicated that a new highway through the village would bring cultural change, another 16 percent selected the construction of distant airports. Although the latter response was incorrect, students who chose it may have associated transportation facilities with cultural change in isolated groups of people.

▶ Question 8 refers to the map below. The island shown is in an early stage of economic development. Transportation systems are not well developed and manufacturing is carried out in homes and small shops for local consumption.


120°W
115°W
110°W
20° N
15° N
10° N
5° N
N
A
B
C
D
E
F
G
H
High Mountains
Navigable River
City
0 200 400
Miles

8. The inhabitants of village F practice subsistence agriculture. They have very limited contact with the outside world and still follow most of the customs of their ancestors. Which of the following would most likely bring about the greatest change in their culture?

A An increase in the birth rate

[✓ **B**] Construction of a highway from city E to city G through the village

C Construction of airports in cities A and G

D Occurrence of a flood in the village

In a related item, students were asked to select a plausible explanation for the lack of change across time in the language of the people of Iceland. Most students (74 percent) correctly identified the relative isolation of the Icelandic people as the reason. Although this finding reinforces the notion that seniors in high school may grasp the effects of isolation on a culture, their knowledge of relevant terminology appears more limited. For example, only 41 percent of the students correctly answered the following question about the definition of cultural diffusion.

The spread of an idea from one part of the world to another is called

A external migration
B integration
C industrialization
[✓ D] cultural diffusion

Twenty-three percent of the group chose integration, 21 percent chose industrialization, and 15 percent opted for external migration as the appropriate response.

Economic Factors

More of the cultural geography items pertained to economic factors than to any other area. The percentage of students responding to these nine items correctly ranged from 75 percent to 35 percent, indicating a wide disparity of knowledge. The following question was designed to measure students' understanding of the factors that influence international trade relations.

Which of the following best explains the low level of trade between Cuba and the United States?

A Cuba and the United States export similar products
[✓ B] Cuba and the United States have strong political differences
C Cuba is far from the United States
D Cuba has protective tariffs

Sixty-eight percent of the twelfth graders indicated that political relationships have an impact on trade. Thirteen percent of the students indicated that countries that produce similar products do not trade, and 12 percent displayed an awareness of the role of tariffs in trade relations.

Two items measuring students' knowledge of major products in U.S. trade relations — steel and grain — showed that 75 percent of the students knew that the U.S. was a net exporter of grain but only 35 percent were able to identify steel as a product imported into this country from Western Europe and Japan. Given the historical importance of the American steel industry, the central role of this material in industrialized countries, and the attention to steel trade in the media, it is quite surprising that so many students were unaware of the role of steel in U.S. trade.

The remaining questions in this topic area were designed to tap students' awareness of factors that support economic growth in both developed and developing countries. Although only slightly more than half (54 percent) of the students recognized the important role of governmental policies in stimulating economic growth, more students were aware of the importance of abundant natural resources (69 percent correct) and the availability of a work force (70 percent).

Urban Population

One of the three items on urban population included in the assessment sought to evaluate students' knowledge of urban land use terminology. Although the results for this item indicate that two-thirds of the high-school seniors possessed some knowledge of "central business districts," their understanding of traffic flow times and patterns in large urban areas was less evident. Even though 61 percent responded correctly to an item on this topic, more than one-quarter of the twelfth graders indicated that 11:00 a.m. on Saturday would be a time of maximum traffic flow on major highways in an urban area.

Similarly, a number of students seemed unaware of factors that influence population distribution, as only 62 percent provided the correct answer on an item addressing this topic. More than one-fifth of the students (22 percent) indicated that the location of mineral resources had the greatest impact on where population concentrations would develop, and another 9 percent indicated that the availability of grazing land was a central determinant of human location.

Subgroup Performance

Similar to the performance differences found in other areas of the geography assessment, White students averaged 63 percent correct across the cultural geography questions, compared with 50 percent for Hispanic students and 45 percent for Black students. Also, males performed better than females on the cultural geography items, averaging 63 percent correct compared with 57 percent for females. Finally, twelfth graders in the Southeast lagged behind their counterparts in the other three regions, averaging 55 percent correct compared with 60 to 61 percent correct.

Relationship Between Cultural Geography Topics Studied and Performance on Cultural Geography Items

Students were asked to report the extent to which they had studied various cultural geography topics — including human migration, population growth and distribution, growth and characteristics of cities, environmental change, regional concepts, and developing countries. Their responses indicate that they were least likely to have studied regional concepts, as only 6 percent reported that they had studied this topic area "a lot" and nearly two-thirds (64 percent) had studied it very little or not at all. Studies of human migration and of urban growth and characteristics were similarly uncommon.

Students were somewhat more likely to have studied population growth and distribution, environmental changes, and developing countries. For each of these topics, 13 to 14 percent reported "a lot" of studies, and 37 to 39 percent reported "some" studies. Overall, though, the extent of students' cultural geography studies appears very limited.

TABLE 4.2 summarizes the relationship between students' reports on their study of cultural geography topics and their performance on cultural geography items in the assessment.

TABLE

4.2

Average Performance on Cultural Geography Items by Extent of Studies of Cultural Geography Topics

Extent Studied	Percent of Students	Average Percent of Correct Responses
None or Very Little	51 (1.8)	60 (0.7)
Some	42 (1.6)	60 (0.9)
A Lot	7 (0.6)	62 (2.4)

Standard errors are presented in parentheses.

Note: No statistically significant differences between groups at the .05 level. The "average percent correct" figure refers to cultural geography items only.

Only 7 percent of the students reported "a lot" of studies in cultural geography, and this small subset of the population performed no better in this topic area than students who reported "some," "very little," or "no" studies. Viewed in light of students' limited exposure to cultural geography concepts and principles, it may be somewhat surprising that the percentages of students who gave correct responses to the questions in this area were as high as they were.

Summary

Although most twelfth-grade students displayed some knowledge of basic concepts in this area, they did not perform well on the assessment questions that required a detailed understanding of cultural geography. For example, students seemed to grasp that people can affect their environment, demonstrating some familiarity with issues highlighted in the media — such as acid rain (79 percent) and chemical pollution (69 percent). Twelfth graders also seemed to understand some factors related to cultural change, including transportation.

On the other hand, students' understanding of economic factors appeared limited. Slightly more than half (54 to 55 percent) correctly answered questions about economic growth in developing countries or the factors influencing employment. Although 75 percent of the high-school seniors recognized the U.S. as a net exporter of grain, only 35 percent were able to identify steel as a product imported to this country.

On average, students reported little study of cultural geography in their high-school courses. More than half reported very little or no study of these topics, while only 7 percent said they had studied cultural geography "a lot."

5

Understanding Physical Geography

This chapter focuses on students' knowledge and understanding of climate, weather, tectonics, and erosion — four important aspects of physical geography. The Earth's place in the solar system affects climatic conditions on the planet and climate, in turn, affects soils and vegetation. Students were asked to identify the meaning of the term "climate," and to apply that knowledge in describing the climate of an area or identifying an area from a climatic description. Because an awareness of the basic tectonic and erosion processes that shape the Earth's surface can help students comprehend our planet's past, present, and future, as well as to recognize some of the factors that influence human settlement patterns, the assessment also included questions on these topics.

TABLE 5.1 summarizes the percentage of students responding correctly to each of the physical geography questions included in the assessment. In general, twelfth-grade students appeared to possess a basic knowledge of climate, volcanism, erosion, and tectonic processes of the sort that could be gained from the media and from everyday experience. Unfortunately, few demonstrated an understanding of physical geography that extended beyond the basics; for example, many were unable to apply their understanding of climate to identify or describe climatic regions or to use their knowledge of erosion to identify some of the landforms it creates.

TABLE

5.1

Understanding of Physical Geography

	Percent Correct
Weathering and soil erosion	72
Hawaiian Islands formed by volcanism	71
Meaning of term "climate"	70
Cause of seasons	68
Evidence of faulting	60
Formation of sedimentary deposits	60
Describe the climate of a region	59
Stream erosion causes V-shaped valleys	56
Identify a region based on climatic data	51
Sea-level rising due to global warming and melting of polar ice	50
Greatest rainfall occurs on windward slope of mountain	43
Rising atmospheric pressure usually indicates dry and sunny weather	31

Tectonics and Erosion

The question shown below assessed students' knowledge of volcanism — a basic tectonic process.

The Hawaiian Islands first came into being as a result of

A the separation of land fragments from Asia
B the formation of coral reefs
[✓ C] volcanic eruptions
D undersea erosion

In response to this question, 71 percent of the students correctly answered that the Hawaiian Islands were initially created by volcanic eruptions. However, almost 13 percent indicated these islands were formed by land segments that had separated from Asia, about 9 percent that they had formed from coral reefs, and about 7 percent that they were the result of undersea erosion. In a related item, 60 percent of the students applied their knowledge of tectonic processes to identify a fault line in a cross-sectional diagram of the Earth's crust.

In addition to the questions on tectonics, students were asked three questions designed to measure their knowledge of erosion. More than 70 percent of the students appeared to know the causes of erosion, while 56 to 60 percent recognized that erosion can contribute to the formation of sedimentary deposits or cause V-shaped valleys.

Climate and Weather

Within the set of questions about climate and weather, the following item required students to identify the causes of the Earth's seasons.

Which of the following, combined with the Earth's revolution around the Sun, causes the seasons?

A The frequency of sunspot occurrences
B The gravitational pull of the Moon
C The intensity of light emitted by the Sun
[✓ D] The tilt of the Earth's axis

Sixty-eight percent of the students selected the correct answer, identifying the tilt of the Earth's axis as a factor that influences the changing seasons, but approximately 16 percent indicated that seasons are caused by the gravitational pull of the moon, about 11 percent reported that the Sun's intensity caused the seasons, and about 5 percent incorrectly responded that the frequency of sunspots caused the seasons.

In response to other questions, approximately 70 percent of the students correctly identified how the term "climate" differs from the term "weather," while fewer students (59 percent) successfully described the climate of a particular region. In responding to the next question, even fewer were able to identify a region from climatic data.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Mean Temperature (in degrees F)	79	79	80	81	81	80	81	81	82	82	82	80	80.7
Total Precipitation (in inches)	7	6	6	7	11	12	10	7	3	2	6	11	88

Which of the following regions would have the range of monthly temperatures and precipitation shown in the chart above?

A Tundra

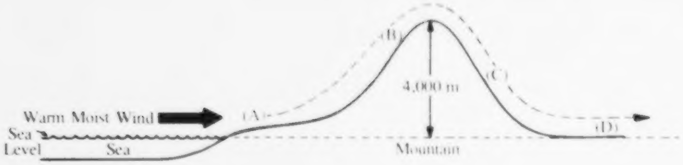
B Savanna

[✓ **C**] Tropical rain forest

D Semiarid desert

The correct answer to this item, tropical rain forest, was chosen by only about half (51 percent) of the students. Almost 29 percent of the students indicated that the data referred to a savanna, about 10 percent said that it referred to a tundra, and about 10 percent said that it referred to a semiarid desert.

The physical geography topics that students appeared to find most difficult addressed the influences of pressure and temperature on local weather and global changes. Relatively few students demonstrated an awareness of these phenomena. For example, only half the students appeared to understand that the rise in sea level is related to global warming and the melting of polar ice, and only 31 percent seemed to know that a rise in atmospheric pressure indicates that local weather conditions will be dry and sunny. Further, as shown by the following question, only about 43 percent of the students were able to identify the area of maximum rainfall from a diagram.



Which of the following lettered regions shown in the diagram above would have the greatest annual precipitation?

A A

[✓ **B**] B

C C

D D

Thirty percent of the students selected option A; 12 percent chose option D, indicating that the area of greatest rainfall is at sea level; and 15 percent chose option C, misunderstanding the side of the mountain on which rain occurs.

Subgroup Performance

There were differences across the three racial/ethnic groups in the average percentage of students responding correctly to the physical geography questions — 61 percent correct on average for White students, 50 percent for Hispanic students, and 44 percent for Black students. Although pervasive, these performance differences were not consistent across all items. For example, more Hispanic and Black students than White students responded correctly to the last item discussed, reporting that the greatest rainfall occurs on the windward slope of a mountain. More minority students than White students also were aware that a rise in atmospheric pressure indicates that local weather conditions will be dry and sunny. Hispanic students were more likely than either Black or White students to correctly identify the rain forest from climatic data.

Gender and regional results were consistent with those presented in previous chapters, with females and students in the Southeast performing less well than males and students in the three other regions of the country. A comparison of the performance of males and females on the physical geography questions indicates that, on average, 7 percent fewer females than males gave correct responses (61 percent correct for males compared with 54 percent correct for females). Students in the Southeast averaged 54 percent correct responses compared with 58 to 59 percent correct for students in other regions of the country.

Relationship Between Physical Geography Topics Studied and Performance on Physical Geography Items

Students participating in the 1988 assessment were asked how much they had studied two topic areas in physical geography: climate and weather, and landforms. About 16 percent of the students reported they had studied climate and weather "a lot," 43 percent reported "some," 28 percent reported "very little," and 13 percent reported "none at all." About 13 percent of the students reported they had studied landforms "a lot," 37 percent reported "some," 32 percent reported "very little," and 18 percent reported "none at all."

As shown in TABLE 5.2, there appears to be a positive relationship between the extent of students' studies in physical geography and their performance on items in this topic area.

TABLE

5.2

Average Performance on Physical Geography Items by Extent of Studies of Physical Geography Topics

Extent Studied	Percent of Students	Average Percent of Correct Responses
None or Very Little	36 (1.8)	57 (0.8)*
Some	47 (1.5)	58 (0.7)*
A Lot	17 (1.3)	62 (1.5)

*Statistically significant difference from "a lot" group at the .05 level. Standard errors are presented in parentheses.

Note: The "average percent correct" figures refer to physical geography items only.

Relatively few students — just 17 percent — reported studying various physical geography topics "a lot." These students exhibited a higher average percentage of correct responses on physical geography items than did students who had studied these topics less extensively, but the performance differences between the groups were not large.

Summary

The NAEP assessment results show that twelfth graders seem to have a limited grasp of how various aspects of physical geography influence human activity. Although most students appeared familiar with the causes of erosion (72 percent), fewer could identify the results it produced (56 to 60 percent). Similarly, high-school seniors recognized the difference between weather and climate (70 percent), but had more difficulty identifying the area of greatest rainfall on a basic diagram or interpreting the relationship between atmospheric pressure and weather. Just two-thirds of the twelfth graders (68 percent) appeared to know what causes the seasons.

When asked how much they had studied various aspects of physical geography in school, about half the students reported receiving "some" instruction and 36 percent reported receiving "little" or "none." However, the relatively few students who reported more study of physical geography topics tended to perform better on the assessment than their peers who reported less extensive studies.

6

Geography Studies in High School

Little information has been available about the extent to which American students actually study geography as part of their high-school curriculum. To gather information about this aspect of education, NAEP asked students assessed in 1988 to report on their geography course-taking and the extent to which they had studied the topics covered in the assessment.

This chapter discusses the amount of time devoted to geography instruction in our nation's high schools and considers the relationship between the study of geography and students' achievement in the assessment. In addition to computing the percentages of students responding correctly to each cognitive question, NAEP used Item Response Theory (IRT) technology to estimate average geography proficiency on a scale ranging from 0 to 500. The main purpose of the IRT analysis was to provide a basis for comparing geography achievement across various population subgroups and examining relationships between overall geography performance and a variety of background factors. However, it does not reveal underlying cause and effect relationships, or the impact of unmeasured factors. The results of the geography assessment are therefore most useful when they are viewed in conjunction with other knowledge about the student population and the educational system, such as trends in instruction, changes in the school-age population, and societal expectations.

Study of Geography Topics

The results for particular areas of geography study, discussed in the preceding chapters of this report, suggest that as the amount of time devoted to the study of specific topics covered in the assessment increased, student performance in those topic areas also increased. Students' responses to the questions on the topics they had studied were used to create a composite variable that reflected the extent to which they had studied the entire set of geography topics. TABLE 6.1 summarizes students' average geographic proficiency by the overall amount of study they reported of the various topics in the assessment — (on average) "little or no" study, "some" study, or "a lot" of study.

A majority of the high-school seniors (54 percent) reported some study of the various geography topics covered in the assessment, and across the subgroups, from 27 to 40 percent of the students reported studying these topics more extensively. Across the nation, 14 percent of the seniors reported virtually no study of basic geographic skills and concepts. On average, there was no significant difference in assessment performance between those reporting very little or no study and those who had at least some exposure to the topics.

TABLE
6.1

Average Geography Proficiency by Geography Topics Studied

	"Little or No" Study		"Some" Study		"A Lot" of Study	
	Percent	Average Proficiency	Percent	Average Proficiency	Percent	Average Proficiency
Nation	14 (1.3)	288 (4.3)	54 (1.5)	293 (1.6)	32 (1.5)	295 (2.1)
Male	13 (1.6)	295 (6.0)	49 (2.0)	302 (2.7)	38 (2.1)	301 (3.1)
Female	14 (1.7)	282 (5.1)	59 (2.1)	286 (1.8)	27 (2.0)	286 (2.8)
White	14 (1.5)	297 (4.6)	56 (1.9)	300 (1.8)	30 (1.8)	303 (2.6)
Black	12 (3.0)	250 (9.5)	48 (3.1)	260 (3.6)	40 (3.5)	261 (3.8)
Hispanic	19 (3.0)	260 (5.7)	46 (5.1)	272 (4.0)	35 (6.5)	279 (6.0)
Northeast	16 (2.9)	295 (10.0)	57 (3.2)	290 (4.5)	27 (2.7)	300 (6.6)
Southeast	12 (2.5)	276 (7.5)	54 (2.8)	285 (2.0)	34 (3.3)	286 (3.1)
Central	15 (2.3)	292 (7.5)	57 (3.3)	298 (2.1)	28 (3.4)	296 (3.7)
West	12 (2.1)	283 (5.5)	50 (2.5)	298 (2.5)	39 (2.4)	297 (3.5)
Academic	13 (1.5)	303 (5.2)	55 (1.7)	302 (1.8)	33 (1.8)	304 (2.9)
General	16 (1.8)	267 (5.7)	55 (2.6)	282 (2.2)	29 (2.3)	278 (2.4)
Vocational/ Technical	15 (3.8)	277 (9.4)	49 (4.7)	263 (4.5)	36 (4.5)	286 (5.3)

Standard errors are presented in parentheses.

Geography Courses Taken

Nearly two-thirds (64 percent) of the seniors reported taking a geography course at some grade from 9 through 12, but high-school students were less likely to take geography the higher their grade level. TABLE 6.2 compares average geographic proficiency for students who had taken a high-school course in the subject with those who had not.

TABLE
6.2

Average Geographic Proficiency by High-school Geography Course-taking

Did you take geography . . .	Yes	No	I Don't Know
in the 9th grade?			
Percent	42 (1.9)	52 (2.1)	6 (0.7)
Average Proficiency	295 (2.1)	292 (1.7)	283 (4.7)
in the 10th grade?			
Percent	32 (1.6)	62 (1.8)	6 (0.7)
Average Proficiency	295 (2.5)	293 (1.5)	278 (4.7)
in the 11th grade?			
Percent	29 (1.8)	65 (1.9)	6 (0.7)
Average Proficiency	292 (2.5)	295 (1.5)	275 (4.9)
in the 12th grade?			
Percent	16 (1.0)	79 (1.2)	6 (0.5)
Average Proficiency	287 (2.9)	295 (1.2)	277 (4.9)
in any high-school grade?*			
Percent	64 (1.6)	33 (1.7)	3 (0.5)
Average Proficiency	294 (1.7)	292 (2.0)	280 (6.0)

*This variable was created by aggregating students' responses to the four questions on geography course-taking. Standard errors are presented in parentheses.

What is perhaps most interesting in these results is that students who reportedly took a high-school geography course performed no better on the assessment than those who had not. In fact, students who stated that they took geography in their senior year performed slightly worse on the assessment than those who took the course in their freshman, sophomore, or junior years. To determine whether there were differences in course-taking across various subpopulations, NAEP analyzed the course-taking results for groups defined by gender, race/ethnicity, region of the country, and type of high-school program. These data are presented in TABLE 6.3.

TABLE

6.3

Average Geographic Proficiency by High-school Geography Course-taking for Demographic Subpopulations

	Taken Geography		**Not Taken Geography**		**Did Not Know**	
	Percent	**Average Proficiency**	**Percent**	**Average Proficiency**	**Percent**	**Average Proficiency**
Nation	64 (1.6)	294 (1.7)	33 (1.7)	292 (2.0)	3 (0.5)	280 (6.0)
Male	68 (2.1)	301 (2.4)	28 (2.1)	304 (2.6)	4 (0.9)	272 (8.5)
Female	60 (2.0)	286 (1.7)	38 (2.1)	284 (2.7)	2 (0.4)	296 (7.7)
White	63 (1.8)	302 (1.9)	35 (1.9)	299 (2.1)	3 (0.4)	286 (6.1)
Black	69 (4.0)	260 (2.7)	30 (3.9)	257 (4.6)	1 (0.6)	233 (12.5)
Hispanic	61 (3.5)	274 (4.2)	33 (3.8)	273 (5.1)	6 (2.1)	246 (7.5)
Northeast	59 (3.8)	296 (5.3)	38 (4.0)	293 (3.8)	3 (0.8)	257 (9.2)
Southeast	65 (3.2)	284 (2.5)	34 (3.6)	285 (3.6)	1 (0.8)	267 (14.0)
Central	60 (2.9)	296 (2.6)	38 (3.1)	297 (3.6)	3 (0.5)	289 (6.4)
West	72 (2.6)	298 (3.1)	23 (2.1)	290 (4.2)	6 (1.4)	291 (8.4)
Academic	63 (2.2)	303 (2.0)	35 (2.3)	304 (2.3)	2 (0.4)	286 (9.1)
General	63 (2.6)	281 (2.2)	32 (2.4)	273 (3.2)	5 (1.2)	279 (8.2)
Vocational/ Technical	69 (4.3)	278 (3.5)	28 (4.2)	265 (4.7)	3 (1.5)	251 (23.4)

Standard errors are presented in parentheses.

Males were more likely than females to report taking geography in high school. White students were no more likely than their Black or Hispanic counterparts to report having taken a course. High-school students living in the West were more likely than those from other regions to report geography course-taking. Finally, students in vocational/technical high-school programs were as likely, if not more so, to state that they had taken a geography course as students either in academic or general programs.

Across the subpopulations studied, twelfth graders who reported they had taken a high-school geography course typically performed no better in the assessment than those who had not taken a course in the subject.

Geography Studies in Related Courses

Although many students did not take geography courses *per se*, they did report studying various geography topics, as discussed in the earlier chapters. Thus, NAEP gathered information on the coverage of geography content in related courses, as shown in TABLE 6.4.

Students were most likely to report studying world geography and physical geography/earth science at grade 9, world history and geography at grade 10, U.S. history and geography at grade 11, and economic and political geography at grade 12. Very few students reported having taken courses in human and cultural geography, state or regional geography, or urban geography in grades 9 through 12.

TABLE

6.4

Types of Geography Courses Taken by Grade Level

Percentage of Students

	Yes, in grade 9	Yes, in grade 10	Yes, in grade 11	Yes, in grade 12
World Geography	30 (2.1)	13 (1.1)	6 (0.8)	3 (0.7)
World History & Geography	18 (1.4)	34 (2.0)	18 (1.6)	6 (0.8)
State/Regional Geography	10 (1.1)	6 (0.7)	8 (1.0)	3 (0.5)
United States Geography	11 (1.1)	9 (0.7)	15 (1.3)	5 (0.6)
United States History & Geography	9 (1.2)	12 (1.1)	48 (2.0)	7 (0.7)
Physical Geography/ Earth Science	29 (1.8)	9 (0.9)	7 (0.7)	4 (0.5)
Economic & Political Geography	4 (0.9)	4 (0.6)	9 (1.0)	24 (1.7)
Human & Cultural Geography	5 (0.6)	7 (0.6)	5 (0.8)	6 (0.6)
Urban Geography	3 (0.5)	3 (0.5)	3 (0.6)	3 (0.5)

Standard errors are presented in parentheses.

To explore whether students who had taken particular geography-related courses demonstrated better geographic proficiency than their classmates who had not taken these courses, NAEP calculated the percentages of students who had taken a course in world geography, U.S. geography, physical geography, or other geography at some grade in high school. Average geographic proficiency was then compared for those who had taken each course with those who had not, as shown in TABLE 6.5.

For the most part, students who reported that their geography instruction was part of their U.S. history instruction demonstrated higher average proficiency in geography than their counterparts who had not taken such a course. Students who reported that geography was taught as part of earth science or courses other than U.S. history generally had similar proficiency in the subject, whether or not they had taken those courses.

TABLE

6.5

Average Geographic Proficiency by Types of Geography-related Courses Taken

	Taken Course		Not Taken Course	
	Percent	Average Proficiency	Percent	Average Proficiency
World Geography/ History	84 (1.5)	293 (1.4)	16 (1.5)	290 (3.1)
U.S. Geography/ History	82 (1.1)	296 (1.3)	18 (1.1)	280 (2.5)
Physical Geography/ Earth Science	49 (1.8)	291 (2.2)	51 (1.8)	294 (1.8)
Other Geography	48 (1.9)	294 (1.9)	52 (1.9)	292 (1.6)

Standard errors are presented in parentheses.

Note: "Other Geography" refers to courses in Economic and Political Geography, Human and Cultural Geography, and Urban Geography.

Summary

Geography appeared to play neither a major nor a consistent role in students' high-school course-taking experience. Most students who did report taking a course in the subject did so in the ninth or tenth grades, but in all, less than two-thirds of the high-school seniors reported taking a geography course at any grade in high school. Students were most likely to receive their geography education as part of world geography or earth science classes in grade 9, world history classes in grade 10 and U.S. history classes in grade 11.

Geography course-taking *per se* was not associated with achievement — a finding that was consistent across most subgroups of the population.

Despite the lack of a clear relationship between course-taking and proficiency, students who reported the most study of geography topics performed better on related areas of the assessment than students who cited more limited studies. Further, students who reported they had studied geography in their U.S. history classes outperformed those who had not.

7

Differences in Geographic Proficiency for Subpopulations

The results presented in the previous chapters make it clear that students vary in their understanding of many aspects of geography. Our nation is very diverse, however, and our schools have typically been more successful in educating some populations than others. This is confirmed in the performance results for subpopulations defined by gender and race/ethnicity in the four broad aspects of geography covered in the assessment — location, skills, physical geography, and cultural geography — and in the relationships between proficiency and course-taking patterns. This chapter explores the relationships between overall geography performance and a variety of background factors, including demographic variables, home influences, and activities generally associated with education achievement, such as homework and television viewing habits.

Demographic Subgroups

TABLE 7.1 summarizes information on the average geographic proficiency of various demographic subgroups. For the most part, the results parallel those from previous NAEP assessments in other subjects such as history, science, and mathematics: on average, White students performed better than Black or Hispanic students, males performed better than females, students in academic programs outperformed those in nonacademic programs, and those in the Southeast were outperformed by those in other regions.

In considering average geography performance, it should be noted that the distributions of performance overlap considerably for the populations being compared. For example, some students in non-academic programs did very well on the assessment, and some in academic programs performed poorly. Thus, the averages obscure the variations in performance among students belonging to any given subpopulation. (See the Data Appendix for performance distributions.) Also, the data do not provide explanations of cause and effect relationships. Thus, it is impossible to say whether students who are most proficient in geography are likely to have certain experiences or whether these experiences actually improved their proficiency.

TABLE 7.1

Average Geographic Proficiency for Demographic Subgroups

	Percent	Average Proficiency
Nation	100 (0.0)	293 (1.0)
Gender		
Male	48 (1.3)	301 (1.6)
Female	52 (1.3)	286 (1.2)
Race/Ethnicity		
White	76 (0.8)	301 (1.1)
Black	14 (0.5)	258 (2.0)
Hispanic	7 (0.5)	272 (3.9)
Region		
Northeast	26 (1.4)	295 (2.8)
Southeast	23 (1.3)	283 (2.1)
Central	25 (0.7)	298 (1.4)
West	26 (0.9)	295 (1.9)
High-school Program		
Academic	59 (1.5)	304 (1.2)
General	32 (1.6)	278 (1.4)
Vocational/Technical	9 (0.8)	276 (2.4)

Standard errors are presented in parentheses.

On average, White students outperformed Hispanic students, who in turn outperformed Black students.

Males performed better on the geography assessment than did females, aligning the performance differences with the results from NAEP's previous science, mathematics, and U.S. history assessments rather than with those from the literature, reading, and writing assessments.[4] It has also been documented that males tend to perform better on tests of spatial orientation — an ability required in such essentials of geography as map reading.[5]

Performance seemed remarkably stable across regions, except for students living in the Southeast, who tended to perform less well than those in the other regions of the country. Enrollment in an academic high-school program appeared to be positively related to geography achievement, as students in such programs performed better than students in either general or vocational/technical programs.

Home Influences

TABLE 7.2 relates the geography assessment results to a variety of home background factors that have been found to be associated with performance in other subject areas assessed by NAEP. These factors were derived from questions about parents' highest levels of education, the number of reading materials available in the home, the number of parents living in the home, the mothers' employment outside the home, and the number of siblings.

As in previous NAEP assessments and numerous other studies, students with well-educated parents, access to a variety of reading materials in their homes, and two parents or guardians living at home performed better on the geography assessment, on average, than did their less advantaged peers. The assessment results indicate that students with one or two siblings performed better than those with no brothers or sisters. Beyond this, students' average proficiency in geography tended to decrease as the number of siblings increased.

---

[4] Educational Testing Service, *The Reading Report Card: 1971-1988* (Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, 1990).

Educational Testing Service, *The Writing Report Card: 1984-1988* (Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, 1990).

Educational Testing Service, *The Science Report Card* (Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, 1988).

Educational Testing Service, *Literature & U.S. History* (Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, 1987).

Educational Testing Service, *The Mathematics Report Card* (Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, 1988).

[5] Torsten Husen (ed.), *International Study of Achievement in Mathematics*, Vol. 2 (New York: Wiley, 1967).

Eleanor Maccoby, "Sex Differences in Intellectual Functioning," in E.E. Maccoby (ed.), *The Development of Sex Differences* (Stanford, CA: Stanford University Press, 1966).

TABLE

7.2

Average Geographic Proficiency by Home Background Factors

	Percent	Average Proficiency
Parents' Level of Education		
No High School Diploma	8 (0.6)	267 (2.4)
Graduated High School	24 (1.1)	284 (1.8)
Post High School	23 (0.9)	294 (1.6)
Graduated College	43 (1.2)	305 (1.5)
Reading Material in the Home		
0-2 Types	13 (0.7)	273 (2.7)
3 Types	24 (0.9)	287 (2.0)
4 Types	63 (1.1)	300 (1.2)
Parents Living at Home		
Both	78 (1.0)	297 (1.3)
One Parent	17 (0.9)	285 (2.6)
Neither	5 (0.4)	274 (3.4)
Mother Working Outside the Home		
Full-Time	55 (1.3)	293 (1.3)
Part-Time	17 (0.9)	299 (2.7)
Not at All	25 (1.1)	295 (1.7)
Number of Siblings		
No Siblings	8 (0.6)	289 (2.8)
1 Sibling	31 (1.1)	299 (1.5)
2 Siblings	27 (1.1)	298 (2.5)
3 Siblings	15 (0.8)	291 (2.4)
4 or More Siblings	19 (1.1)	285 (1.9)

Standard errors are presented in parentheses.

Students who reported that their mothers worked performed no better or worse on the assessment than those who reported that their mothers did not work outside the home.

Television, Homework, and Part-time Work

Because there is often concern that television and after-school jobs detract from students' time to do homework and pursue academic endeavors, NAEP asked students to report the amount of time they spent on these non-school activities. The results are summarized in TABLE 7.3.

On average, geography proficiency was higher for students who reported doing homework (as measured both in time spent and pages read) and limiting their television viewing time each day to two hours or less. Students who reported spending a moderate amount of time each week at a part-time job also exhibited higher proficiency in geography. However, students who reported working more than 20 hours per week performed less well than students who worked fewer hours or not at all.

TABLE

7.3

Average Geographic Proficiency in Relation to Time Spent on Television, Homework, and Part-time Work

	Percent	Average Proficiency
Hours of TV Viewing Each Day		
0-2 Hours	51 (1.2)	300 (1.5)
3-5 Hours	44 (1.2)	289 (1.3)
6 or More Hours	6 (0.5)	266 (3.4)
Hours Spent on Homework Each Day		
None Assigned	8 (0.7)	277 (2.7)
Did Not Do It	9 (0.7)	289 (3.4)
1/2 Hour or Less	21 (1.1)	295 (1.9)
1 Hour	34 (1.0)	294 (1.6)
2 Hours	17 (0.9)	295 (1.9)
More than 2 Hours	10 (0.6)	299 (2.5)
Pages Read for Homework Each Day		
5 or Fewer Pages	31 (1.1)	285 (1.7)
6 - 10 Pages	24 (1.0)	291 (1.9)
11 - 15 Pages	16 (0.8)	293 (1.7)
16 - 20 Pages	13 (0.7)	299 (2.6)
More Than 20 Pages	16 (1.1)	308 (2.5)
Hours Worked Per Week		
No Part-Time Job	34 (1.2)	293 (1.5)
1 to 15 Hours	27 (1.0)	299 (1.6)
16 to 20 Hours	17 (0.8)	294 (2.1)
21 to 30 Hours	16 (0.8)	288 (3.2)
More Than 30 Hours	5 (0.5)	283 (3.7)

Standard errors are presented in parentheses.

Summary

In general, the geography proficiency results for subgroups were consistent with those from NAEP assessments in other curriculum areas. That is, White students tended to perform better than their minority classmates, males tended to outperform females, and students in academic high-school programs tended to have higher proficiency than those in either general or vocational/technical programs. Also, students who reported having well-educated parents, access to a greater number of reading materials in the home, and both parents living in the home outperformed their less advantaged peers, on average. Students who said they did homework and refrained from watching excessive amounts of television also tended to have higher geographic proficiency.

Procedural Appendix

A Description of the 1988 NAEP Geography Assessment

An Introduction to The Nation's Report Card

The Nation's Report Card, the National Assessment of Educational Progress (NAEP), is an ongoing, congressionally mandated project established in 1969 to obtain comprehensive and dependable data on the educational achievement of American students. From its inception to 1980, NAEP conducted annual assessments of 9-, 13-, and 17-year-olds attending public and private schools, and it has carried out biennial assessments since then. It remains the only regularly conducted educational survey at the elementary-, middle-, and high-school levels. To date, more than 1.3 million young Americans have participated in the NAEP assessments.

Across the years, The Nation's Report Card has evaluated students' proficiencies in reading, writing, mathematics, science, and social studies, as well as literature, art, music, citizenship, computer competence, and career and occupational development. Several of these subjects have been assessed multiple times, permitting an analysis of trends in student achievement. In the 1987-88 school year, reading, writing, civics, and U.S. history were assessed, in addition to the special geography assessment of 17-year-olds and twelfth graders.

NAEP assessments reflect a broad consensus of educators, scholars, and citizens representative of many diverse constituencies and points of view. Panels of experts developed the 1988 geography assessment objectives, proposing goals they felt students should achieve in the course of their education.[6] After extensive reviews, the objectives were given to item writers who developed assessment questions to fit the specifications set forth in the objectives. A limited set of subject area background questions was prepared, in addition to the general background and cognitive questions, to provide a basis for examining policy-relevant issues.

---

[6] Educational Testing Service, *Geography Objectives: 1988 Assessment* (Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, 1988).

The subject-specific questions asked students for information on the kinds of geography instruction they had received, as well as on their education-related activities, attitudes, and resources.

All items for the 1988 assessment — cognitive and background alike — underwent intensive reviews by subject-matter and measurement specialists and by sensitivity reviewers whose purpose was to eliminate any material potentially biased or insensitive toward particular groups. The items were then field tested, revised, and administered to a stratified, multi-stage probability sample selected so that the assessment results could be generalized to the national population.

Following each NAEP assessment, the results are published in reports that describe patterns and trends in achievement in a given subject area. The NAEP reports are widely disseminated to legislators, educators, and others concerned with improving education in this country.

The Nation's Report Card is supported by the U.S. Department of Education, Office of Educational Research and Improvement, and directed by the National Center for Education Statistics. Educational Testing Service has been the grantee for the project since 1983. NAEP is governed by the National Assessment Governing Board, an independent, legislatively defined board.

The 1988 Geography Assessment

The 1988 geography assessment, the first ever conducted by The Nation's Report Card, was made possible through additional support provided by the National Geographic Society. This report summarizes data on the geography performance of more than 3,000 American high-school seniors.

The objectives forming the basis for NAEP's geography assessment emphasized that students should be able to use the skills and tools of geography, including maps, charts, and globes; that they should have knowledge and understanding of the concepts underlying cultural and physical geography, including the location of places, resources, and cultural areas; and that they should understand the application of geographic principles. The assessment included 76 multiple-choice questions spanning a broad range of topics that reflect the extremely large field of geographic study; these topics embraced environmental issues as well as historical, political, cultural, and economic phenomena.

Although resource limitations precluded in-depth investigation of every topic, students were asked about a wide variety of skills, knowledge, and understandings, and the results provide a basis for further study. For example, students were asked to use maps and globes to identify and interpret symbols, use latitude and longitude, understand projections, interpret thematic maps, and detect patterns. Questions about location pertained to a number of major physical features — continental land masses, oceans, rivers, land forms, natural resources, and climatic regions — as well as cities, countries, and the cultural attributes of regions. Within cultural geography, NAEP measured students' understanding of how various economic activities are related to our environment and to patterns of development. The questions about physical geography encompassed terms and processes from the areas of climatology and meteorology, as well as the topography and formation of the Earth's geographic features. In addition to the geography questions, students completed two questionnaires — one designed to collect basic demographic information and the second to provide information about course-taking patterns and topics studied in geography classes.

Because the 1988 geography assessment is a precursor to future NAEP geography assessments that will measure trends in achievement, the items will remain secure so the questions can be readministered to high-school seniors in future years. According to NAEP's legislatively mandated schedule, the next geography assessment will be conducted in 1994.

Sampling, Data Collection, and Scoring

The 1988 geography assessment was part of a larger NAEP effort involving approximately 1,500 schools with 130,000 students at the elementary school (age 9/grade 4), middle school (age 13/grade 8), and high school (age 17/ grade 12) levels.[7] In addition to the special assessment supported by the National Geographic Society, NAEP evaluated student performance in reading, writing, U.S. history, and civics in 1988.

Sampling and data collection activities for the 1988 assessment were conducted by Westat, Inc. As with all NAEP assessments, the 1988 assessment was based on a deeply stratified, three-stage sampling design. The first stage involved stratifying primary sampling units (counties or aggregates of small counties) by region and community type and making a random selection. The second stage entailed the enumeration, stratification, and random selection of public and private schools. The third stage consisted of the random selection of students from each school for participation in NAEP.

The overall structure of the 1988 assessment used a focused Balanced Incomplete Block (BIB) spiral matrix design, whereby not all students responded to all items in the assessment. This enabled coverage of a number of subject areas while minimizing the burden for any one student. Each assessment booklet required about an hour: five minutes apiece for each of the two questionnaires, and 45 minutes for the content questions.

As a result of this design, some assessment booklets contained items in only one subject area, with sets of items paired across booklets, and other booklets contained sets of items in several subject areas, permitting an analysis of inter-subject correlations.

Of the 3,030 students assessed in geography, 1,800 students answered all 76 geography questions, and an additional 1,230 students responded to about 26 of these questions in addition to some reading, history, or civics questions, thus permitting NAEP to study performance across subject areas.

---

[7] 1988 participation figures are obtained from *Report on Field Operations and Data Collection Activities, NAEP-Year 19 (1987-88)*, prepared by Westat, Inc. (1989).

All data were collected by a trained field staff. In the 1988 assessment at age 17/grade 12, 78 percent of the sampled schools and 77 percent of the sampled students participated in the assessment. Some students sampled (less than 5 percent) were excluded from the assessment because of limited English proficiency or severe handicap. In 1984, NAEP began collecting descriptive information on these excluded students.

Following the session, the assessment administrators sent completed materials back to ETS for processing. The booklets were then scanned and information was transcribed to the NAEP database. All data collection and processing activities were conducted with attention to rigorous quality control procedures.

The Data Analyses

After the geography booklets were scored, the data were weighted to match known population proportions and adjusted for nonresponse. Analyses included computing the percentages of twelfth-grade students giving various responses to the questions and estimating the average percentage of students responding correctly to particular sets of items (e.g., location, skills, cultural geography, and physical geography). Because a nationally representative sample of students answered each question, these results are also available for subgroups of students as defined by region, gender, and race/ethnicity.

Item Response Theory (IRT) technology also was used to estimate average geography proficiency for the nation and various subpopulations. The main purpose of IRT analysis is to provide a common scale on which performance can be compared across groups and subgroups, whether tested at the same time or a number of years apart. It allows NAEP to estimate performance for any group or subgroup even though all respondents did not answer all the questions in the pool. This technology can also be used to estimate the relationships among proficiencies in various subject areas.

IRT defines the probability of answering an item correctly as a mathematical function of proficiency or skill. NAEP's estimated statistics describing national and subgroup proficiency are computed as expected values of the figures that would have been obtained had individual proficiencies been observed, given the data that were in fact observed — that is, responses to the cognitive and background items.[8]

The NAEP assessments also make it possible to examine relationships between student performance and a variety of background factors, relating achievement to one variable or composite variables. These analyses, however, do not reveal the underlying causes of these relationships, which may be influenced by a number of variables. For example, NAEP cannot determine whether the study of geography topics raises students' proficiency or whether students who are more proficient in the subject simply choose to study various geography topics more extensively. Similarly, the assessments do not capture the influence of unmeasured variables. Therefore, the results are most useful when they are considered in combination with other knowledge about the student population and the educational system, such as trends in instruction, changes in the school-age population, and societal demands and expectations.

Estimating Variability in Proficiency Measures

The standard error, computed using a jackknife replication procedure, provides an estimate of sampling reliability for NAEP measures. The jackknife methodology is used to estimate the sampling variability of all reported statistics because conventional formulas for estimating standard errors of sampling statistics are inappropriate for use with such complex sampling procedures. The standard error is composed of sampling error and other random error associated with the assessment of a specific item or set of items. Random error includes all possible nonsystematic error associated with administering specific items to specific students in specific situations. The estimated population mean ± 2 standard errors represents an approximate 95 percent confidence interval. It can be said with about 95 percent certainty that the performance of the population of interest is within this interval.[7]

---

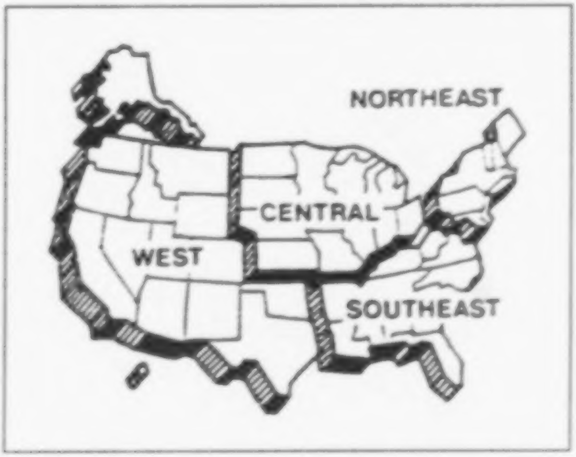
[8] For theoretical justification of the procedures employed, see Robert J. Mislevy, ETS Research Report #88-54-ONR, *Randomization-based Inferences About Latent Variables from Complex Samples* (Princeton, NJ: Educational Testing Service, 1988). For computational details, see *Expanding the New Design: NAEP 1985-86 Technical Report* (Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, 1988).

NAEP Reporting Groups

NAEP reports performance for the nation and for groups of students defined by shared characteristics. In addition to national results, this report contains information about subgroups defined by region of the country, sex, and race/ethnicity. The following section defines these and other subpopulations referred to in this report.

Region

The country has been divided into four regions: Northeast, Southeast, Central and West. States included in each region are shown on the following map.



---

[7] For a complete description of NAEP variance estimation, see *Expanding the New Design: The NAEP 1985-86 Technical Report* (Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress, 1988).

Gender

Results are reported for males and females.

Race/Ethnicity

Results are presented for Black, White, and Hispanic students, based on students' identification of their race/ethnicity according to the following categories: White, Black, Hispanic, Asian or Pacific Islander, American Indian or Alaskan Native, and Other. Although the sample sizes were insufficient to permit separate reliable estimates for all subgroups defined by race/ethnicity, all students were included in computing the national estimates of average geography performance.

Additional Background Factors

In addition to gathering information on students' gender, race/ethnicity, and the region in which they live, NAEP collects data from all students on a number of background questions, including the type of school program in which they are enrolled, the number and types of reading materials in the home, the highest level of parents' education, and the amount of time spent on homework. Students participating in the geography assessment were also asked a series of background questions specific to their geography course of study. To report students' responses to these questions in a useful way, NAEP has developed composite variables by analyzing students' responses to certain sets of the background questions.

Data Appendix

Average Geographic Proficiency

Nation	293.1 (1.0)
Sex	
Male	301.2 (1.6)
Female	285.7 (1.2)
Race/Ethnicity	
White	301.1 (1.1)
Black	258.4 (2.0)
Hispanic	271.8 (3.9)
Region	
Northeast	295.0 (2.8)
Southeast	283.3 (2.1)
Central	298.2 (1.4)
West	295.3 (1.9)
Parental Education	
Not graduated high school	267.0 (2.4)
Graduated high school	283.5 (1.8)
Education past high school	294.2 (1.6)
Graduated college	305.3 (1.5)

Geography Proficiency Means, Standard Deviations, and Percentile Distributions with Standard Errors

Nation

Mean		293.1 (1.0)
St. Dev.		37.0 (0.8)
Percentiles	5	227.5 (2.7)
	10	242.2 (1.6)
	25	268.7 (2.0)
	50	295.5 (1.5)
	75	319.1 (0.9)
	90	338.6 (1.3)
	95	349.1 (3.3)

Male

Mean		301.2 (1.6)
St. Dev.		38.3 (1.0)
Percentiles	5	231.6 (2.2)
	10	247.1 (2.8)
	25	275.6 (2.8)
	50	305.6 (2.0)
	75	328.4 (1.6)
	90	346.6 (2.3)
	95	358.3 (4.8)

Female

Mean		285.7 (1.2)
St. Dev.		34.2 (0.9)
Percentiles	5	224.3 (2.5)
	10	238.9 (2.2)
	25	263.7 (1.3)
	50	289.2 (1.2)
	75	310.0 (1.2)
	90	327.6 (2.2)
	95	337.9 (3.6)

White

Mean		301.1 (1.1)
St. Dev.		33.7 (0.9)
Percentiles	5	242.3 (2.8)
	10	256.4 (2.9)
	25	279.7 (1.4)
	50	302.7 (1.4)
	75	323.7 (1.4)
	90	341.9 (2.1)
	95	352.9 (2.1)

Black

Mean		258.4 (2.0)
St. Dev.		32.0 (1.2)
Percentiles	5	207.3 (3.7)
	10	216.8 (3.5)
	25	234.7 (2.9)
	50	259.4 (3.5)
	75	282.2 (3.8)
	90	298.8 (2.5)
	95	310.5 (7.8)

Hispanic

Mean		271.8 (3.9)
St. Dev.		35.0 (1.6)
Percentiles	5	214.4 (8.6)
	10	225.0 (7.4)
	25	245.8 (3.4)
	50	273.1 (5.6)
	75	296.9 (2.8)
	90	317.8 (8.7)
	95	331.1 (3.0)

Standard errors are presented in parentheses.

Performance in Geographic Content and Skill Areas

PERCENTAGE OF STUDENTS RESPONDING CORRECTLY

Geographic Locations	Nation	Male	Female	White	Black	Hisp	NEast	SEast	Cent	West
Locate Canada on a world map	86.6 (0.8)	89.7 (0.9)	83.8 (1.2)	90.3 (0.8)	68.9 (2.4)	77.1 (3.2)	86.8 (1.9)	80.2 (1.3)	90.1 (1.3)	88.7 (1.4)
Locate the Soviet Union on a world map	85.4 (0.9)	87.1 (1.2)	83.9 (1.3)	88.0 (0.9)	73.2 (2.0)	77.6 (3.9)	87.5 (1.7)	81.2 (2.5)	86.0 (1.3)	86.4 (1.9)
Identify countries in the Middle East from a series of lists	83.8 (0.8)	85.7 (1.2)	82.1 (1.1)	85.2 (1.0)	76.9 (2.6)	79.3 (2.5)	86.6 (1.7)	82.7 (1.5)	82.9 (1.5)	83.0 (1.4)
Identify cold, dry, tundralike regions on a world map	74.2 (1.2)	78.3 (1.6)	70.6 (1.6)	78.3 (1.4)	58.3 (2.5)	64.1 (3.9)	76.8 (2.5)	67.2 (1.9)	77.7 (2.2)	74.5 (2.1)
Identify petroleum exporting countries on a world map	71.5 (1.3)	76.3 (1.6)	67.0 (1.8)	74.5 (1.6)	56.5 (2.3)	63.3 (4.4)	73.3 (3.2)	65.9 (2.3)	72.7 (2.5)	73.6 (2.2)
Locate Latin America on a world map	70.7 (1.3)	76.7 (1.4)	65.3 (1.6)	74.8 (1.5)	44.5 (2.4)	68.7 (4.0)	72.8 (2.7)	60.5 (2.8)	73.8 (2.5)	74.5 (1.7)
Identify climate types comparing northern Europe and Saudi Arabia	67.5 (1.1)	73.7 (1.4)	62.0 (1.8)	72.4 (1.2)	44.5 (3.2)	56.7 (3.6)	69.5 (2.3)	61.1 (2.1)	67.8 (2.3)	70.9 (2.1)
Know that the Mississippi River flows into the Gulf of Mexico	67.0 (1.2)	75.9 (1.3)	59.1 (1.8)	72.9 (1.3)	43.9 (3.6)	43.4 (3.9)	65.5 (2.7)	66.1 (2.7)	72.3 (2.4)	63.9 (1.5)
Identify the locational order of four U.S. West coast cities	63.8 (1.1)	68.7 (1.6)	59.5 (1.8)	70.1 (1.1)	38.3 (3.6)	46.1 (3.7)	63.8 (2.8)	54.8 (2.8)	66.6 (1.7)	69.3 (2.0)
Identify hot, dry, desertlike regions on a world map	59.7 (1.3)	68.2 (1.7)	52.2 (1.6)	63.8 (1.6)	40.9 (2.5)	54.5 (4.0)	56.1 (3.0)	54.5 (2.0)	67.9 (2.0)	60.2 (2.8)
Locate the Pacific Ocean relative to South America	58.7 (1.2)	63.5 (1.5)	54.2 (1.8)	60.8 (1.4)	47.5 (3.3)	55.1 (4.9)	57.2 (3.2)	54.4 (2.4)	60.2 (2.2)	62.6 (2.0)
Locate Jerusalem on a regional map	58.2 (1.5)	64.4 (2.4)	52.4 (1.7)	62.7 (1.7)	35.0 (3.1)	54.3 (3.6)	58.9 (2.9)	51.2 (2.1)	58.6 (2.8)	63.2 (3.6)
Locate the Andes Mountains on a map of South America	53.1 (1.2)	60.6 (1.8)	46.1 (1.8)	57.4 (1.5)	29.9 (2.0)	45.6 (4.1)	46.1 (3.1)	51.9 (2.0)	60.9 (1.8)	53.7 (2.8)
Identify Canada and Australia as having similar population densities	52.1 (1.4)	54.5 (2.3)	50.0 (2.0)	56.2 (1.5)	35.6 (2.8)	36.1 (3.9)	54.9 (3.5)	49.0 (2.5)	49.9 (2.6)	54.4 (1.8)
Identify a population distribution on an Eastern hemisphere map	50.8 (1.5)	59.5 (2.2)	43.1 (1.6)	56.2 (1.8)	26.2 (2.4)	36.2 (3.1)	50.3 (3.4)	40.9 (1.8)	57.4 (3.3)	53.8 (2.4)
Know that the Panama Canal reduced sailing time from New York to San Francisco	50.0 (1.4)	59.5 (1.9)	41.5 (1.6)	54.6 (1.6)	29.8 (3.1)	37.9 (3.1)	50.9 (3.1)	41.3 (2.0)	55.6 (2.9)	51.2 (2.5)
Identify a distribution of coal deposits on a U.S. map	48.0 (1.9)	51.7 (2.8)	44.8 (2.3)	51.9 (2.3)	33.7 (3.1)	35.5 (4.5)	45.4 (4.4)	52.7 (2.5)	53.0 (4.0)	41.6 (3.1)
Identify an incorrect pairing of countries and their major rivers	46.3 (1.4)	47.5 (2.3)	45.3 (1.7)	50.7 (1.5)	30.4 (3.0)	28.7 (3.9)	52.5 (4.1)	40.3 (1.7)	44.8 (2.1)	47.0 (2.6)
Identify the locational order of four U.S. East coast cities	43.1 (1.6)	47.2 (2.0)	39.2 (1.7)	45.5 (2.0)	40.0 (3.1)	28.5 (3.0)	62.9 (3.5)	37.5 (1.8)	40.6 (3.1)	30.7 (2.3)

Standard errors are presented in parentheses.

Performance in Geographic Content and Skill Areas

PERCENTAGE OF STUDENTS RESPONDING CORRECTLY

Geographic Locations (cont'd)	**Nation**	**Male**	**Female**	**White**	**Black**	**Hisp**	**NEast**	**SEast**	**Cent**	**West**
Locate Nigeria on a map of Africa	41.7 (1.4)	49.1 (1.8)	35.1 (1.9)	44.2 (1.6)	32.1 (3.2)	34.2 (2.9)	45.9 (3.3)	37.2 (2.1)	41.9 (2.2)	41.1 (3.3)
Locate Southeast Asia on a world map	36.5 (1.6)	42.6 (2.4)	31.0 (2.2)	38.7 (1.8)	22.0 (1.3)	27.8 (3.4)	41.5 (4.1)	26.6 (3.5)	36.0 (2.0)	40.9 (2.7)
Know that Saudi Arabia is bounded by the Red Sea and the Persian Gulf	35.5 (1.3)	41.3 (2.0)	30.1 (1.6)	36.0 (1.6)	32.9 (3.4)	29.6 (4.3)	34.8 (2.9)	31.2 (1.9)	37.4 (3.1)	38.3 (2.0)
Identify Japan as the country most like Canada in living standards	35.3 (1.3)	44.7 (2.2)	26.9 (1.5)	38.3 (1.6)	21.1 (2.5)	30.3 (3.5)	36.6 (3.5)	29.8 (2.1)	35.8 (2.5)	38.2 (2.3)
Identify the order of the oceans, moving west to east from Africa	33.2 (1.4)	40.4 (2.0)	26.8 (2.1)	36.5 (1.8)	19.3 (3.9)	25.5 (4.6)	36.6 (3.2)	26.2 (2.3)	36.3 (2.7)	32.7 (2.4)
Average Percent Correct on Locational Items	**57.2 (1.3)**	**62.8 (1.8)**	**52.2 (1.7)**	**60.8 (2.1)**	**40.9 (2.9)**	**47.3 (3.8)**	**58.9 (3.0)**	**51.9 (2.2)**	**59.4 (2.4)**	**58.1 (2.3)**
Geographic Skills and Tools										
Use a map to compare two countries	77.8 (0.9)	77.2 (1.4)	78.4 (1.0)	83.0 (0.9)	57.0 (2.4)	64.5 (4.9)	8.4 (1.4)	74.6 (1.8)	78.4 (1.8)	79.6 (1.7)
Identify type of country shown on a population pyramid	70.0 (1.1)	68.2 (1.7)	71.6 (1.3)	74.2 (1.3)	54.2 (2.4)	58.6 (3.5)	68.1 (1.7)	66.2 (2.4)	72.5 (2.0)	72.9 (2.3)
Identify information shown/not shown on a map	65.3 (1.1)	71.4 (2.0)	59.9 (1.5)	68.8 (1.5)	51.6 (3.2)	56.0 (4.2)	63.4 (2.8)	60.4 (2.5)	70.4 (2.2)	66.6 (2.0)
Identify information shown on a cartogram	64.7 (1.2)	66.8 (1.8)	62.8 (1.5)	68.3 (1.2)	50.2 (3.1)	54.1 (4.9)	65.2 (2.2)	60.0 (1.8)	68.9 (2.2)	64.5 (2.5)
Identify latitude and longitude of a place on a map	61.6 (1.4)	64.8 (2.2)	58.6 (1.6)	64.8 (1.7)	43.8 (3.0)	54.4 (4.5)	61.2 (4.0)	59.4 (2.2)	60.7 (2.2)	64.8 (2.1)
Identify cross section shown on contour map	59.5 (1.5)	67.3 (1.9)	52.6 (2.0)	65.6 (1.7)	31.1 (2.9)	44.1 (3.7)	60.8 (4.2)	48.5 (2.4)	64.6 (2.1)	63.2 (2.0)
Identify two cities with similar longitude on a map	57.6 (1.1)	58.4 (1.8)	56.9 (1.4)	61.0 (1.2)	42.5 (2.9)	45.1 (4.0)	57.5 (3.3)	56.7 (2.1)	57.7 (1.4)	58.6 (1.9)
Identify appropriate map for navigation	56.1 (1.3)	60.1 (1.6)	52.5 (1.6)	57.2 (1.5)	45.9 (3.5)	59.0 (3.8)	57.1 (3.0)	54.0 (2.8)	54.6 (2.8)	58.3 (2.6)
Use information on a map to select a site for industry	56.0 (1.1)	64.5 (1.5)	48.4 (2.1)	60.5 (1.5)	38.7 (2.8)	35.6 (4.3)	57.1 (2.8)	51.8 (2.2)	55.4 (1.8)	59.3 (2.1)
Identify correct orientation of U.S. state	55.2 (1.2)	63.9 (1.6)	47.1 (1.8)	59.5 (1.5)	34.8 (2.8)	46.5 (3.5)	54.1 (2.6)	50.1 (1.8)	60.1 (2.7)	56.2 (2.2)
Identify the prime meridian	55.1 (1.5)	59.2 (2.0)	51.3 (1.8)	58.6 (1.8)	40.2 (3.1)	47.2 (4.4)	55.2 (4.2)	47.2 (2.4)	59.3 (2.3)	57.7 (2.8)
Use a map to identify a likely type of land formation	48.0 (1.3)	55.4 (1.8)	41.4 (1.7)	52.6 (1.7)	28.4 (2.3)	33.4 (3.6)	51.1 (3.7)	42.2 (2.3)	51.6 (2.3)	46.3 (2.8)
Identify an area shown on a graph with climatic data	45.2 (1.2)	46.4 (1.6)	44.1 (1.6)	47.0 (1.5)	40.7 (3.0)	38.6 (4.1)	47.9 (2.8)	43.5 (2.2)	45.9 (2.8)	43.1 (2.2)

Standard errors are presented in parentheses

Performance in Geographic Content and Skill Areas

PERCENTAGE OF STUDENTS RESPONDING CORRECTLY

Geographic Skills and Tools (cont'd)	**Nation**	**Male**	**Female**	**White**	**Black**	**Hisp**	**NEast**	**SEast**	**Cent**	**West**
Recognize areas distorted on a specific projection	34.7 (1.1)	36.6 (1.6)	32.9 (1.5)	35.9 (1.4)	28.4 (2.8)	30.1 (2.8)	35.4 (2.1)	31.4 (1.5)	34.4 (2.6)	37.1 (2.2)
Interpret a graph showing birth and death rates	29.4 (1.0)	31.8 (1.5)	27.1 (1.6)	31.0 (1.0)	21.3 (2.3)	25.2 (2.3)	30.1 (2.7)	28.6 (1.8)	29.7 (1.7)	29.0 (1.7)
Recognize how a projection tries to reduce distortion	28.8 (1.4)	30.4 (2.0)	27.3 (1.7)	31.2 (1.6)	19.3 (3.0)	22.0 (3.6)	30.9 (2.4)	21.8 (1.4)	31.1 (3.1)	30.4 (3.1)
Use a map to identify a likely area of soil erosion	27.0 (1.1)	29.2 (1.8)	25.0 (1.4)	28.2 (1.4)	22.7 (2.3)	23.0 (4.4)	25.4 (2.6)	27.9 (2.5)	26.9 (1.7)	27.9 (2.4)
Average Percent Correct on Skills Items	**52.5** **(1.2)**	**56.0** **(1.8)**	**49.3** **(1.6)**	**55.7** **(1.4)**	**38.3** **(2.8)**	**43.4** **(3.9)**	**52.9** **(2.9)**	**48.5** **(2.1)**	**54.2** **(2.2)**	**53.9** **(2.3)**
Cultural Geography										
Prevention of acid rain	79.4 (1.0)	81.6 (1.3)	77.3 (1.3)	83.6 (0.9)	66.0 (3.2)	63.7 (4.7)	76.9 (2.2)	78.2 (1.5)	83.6 (2.0)	79.0 (2.1)
U.S. net exporter of grain	75.3 (1.1)	80.0 (1.8)	71.0 (1.4)	79.5 (1.3)	52.0 (3.9)	70.5 (4.4)	73.5 (2.7)	70.9 (2.6)	76.8 (2.2)	79.4 (1.6)
Impact of isolation on cultural change	74.3 (1.0)	75.6 (1.4)	73.2 (1.8)	78.8 (1.2)	59.6 (3.2)	60.1 (4.7)	75.4 (2.5)	70.6 (2.0)	76.3 (1.6)	74.7 (2.2)
Essentials for industrialization	69.6 (1.2)	70.6 (1.8)	68.6 (1.8)	72.3 (1.3)	57.5 (3.1)	56.3 (4.6)	69.3 (3.3)	64.6 (1.7)	71.3 (2.4)	72.5 (2.0)
Impact of chemicals on pollution	69.0 (0.9)	69.2 (1.4)	68.8 (1.5)	73.1 (0.9)	49.6 (3.2)	61.5 (3.7)	66.9 (2.3)	66.3 (1.8)	70.9 (1.5)	71.6 (1.9)
Factors influencing economic development of Japan	68.5 (1.2)	71.5 (1.6)	65.7 (1.7)	73.5 (1.2)	49.8 (3.1)	51.8 (5.5)	69.6 (2.6)	63.0 (2.1)	69.9 (2.6)	71.0 (2.5)
Factors influencing cultural change	68.1 (1.3)	69.1 (1.8)	67.3 (1.9)	72.5 (1.4)	53.4 (3.6)	52.6 (3.3)	70.7 (3.0)	62.0 (3.0)	67.5 (1.5)	71.7 (2.5)
Factors affecting trade relations between the U.S. and Cuba	67.9 (1.1)	74.8 (1.5)	61.8 (1.8)	69.7 (1.2)	55.5 (2.7)	68.9 (3.5)	71.7 (2.4)	64.5 (1.6)	66.9 (2.3)	68.1 (2.6)
Urban land use terminology	67.4 (1.2)	67.2 (1.7)	67.6 (1.4)	70.3 (1.5)	54.3 (3.3)	62.5 (3.7)	71.1 (2.1)	60.8 (2.5)	69.9 (2.7)	67.2 (2.2)
Changes in Midwest vegetation cover	65.4 (1.2)	70.2 (1.5)	61.2 (1.6)	70.7 (1.4)	43.3 (2.9)	47.7 (4.1)	65.6 (2.7)	58.7 (2.6)	73.3 (1.9)	63.5 (2.3)
Factors influencing business location	64.2 (1.3)	69.0 (1.7)	59.8 (1.4)	67.8 (1.4)	43.7 (2.7)	57.2 (4.4)	63.9 (2.5)	60.0 (2.5)	64.7 (2.5)	67.7 (3.1)
Factors influencing population distribution	61.8 (1.1)	62.4 (1.6)	61.3 (1.4)	65.5 (1.4)	49.8 (2.5)	51.6 (3.7)	63.2 (2.5)	60.8 (2.4)	65.9 (2.5)	57.4 (1.8)
Traffic flow in urban areas	61.4 (1.2)	62.4 (1.5)	60.4 (1.6)	63.2 (1.4)	55.3 (3.6)	59.9 (2.7)	67.0 (2.5)	58.7 (3.1)	62.8 (2.6)	56.7 (1.8)

Standard errors are presented in parentheses.

Performance in Geographic Content and Skill Areas

PERCENTAGE OF STUDENTS RESPONDING CORRECTLY

Cultural Geography (cont'd)	Nation	Male	Female	White	Black	Hisp	NEast	SEast	Cent	West
Impact of vegetation removal	58.5 (1.2)	62.2 (1.5)	55.0 (1.8)	63.4 (1.4)	38.2 (3.3)	43.3 (4.5)	57.9 (2.4)	55.5 (1.7)	63.2 (2.1)	57.2 (3.0)
Factors influencing employment	55.4 (1.3)	58.9 (1.8)	52.2 (1.9)	57.7 (1.5)	45.5 (4.1)	50.3 (3.9)	56.7 (3.3)	53.5 (2.4)	54.7 (2.4)	56.4 (2.4)
Impact of technological developments on U.S. agriculture	54.3 (1.3)	57.8 (1.8)	51.0 (1.8)	57.2 (1.6)	44.6 (3.4)	40.1 (4.2)	56.7 (2.3)	50.9 (2.8)	52.3 (3.0)	56.7 (2.7)
Economic growth in developing countries	53.5 (1.5)	56.3 (2.1)	51.0 (2.2)	56.3 (1.8)	38.7 (3.2)	45.3 (4.8)	53.8 (3.0)	46.7 (2.4)	55.7 (3.2)	57.3 (3.1)
Causes of the greenhouse effect	53.1 (1.5)	58.4 (2.4)	48.3 (1.6)	56.7 (1.7)	34.3 (3.3)	39.0 (4.9)	55.5 (3.6)	50.6 (3.0)	54.1 (1.5)	51.8 (3.7)
Impact of urban areas on the physical environment	48.8 (1.1)	51.1 (1.6)	46.9 (1.5)	51.6 (1.3)	36.1 (2.3)	42.8 (3.5)	53.1 (2.7)	46.2 (1.8)	49.8 (2.5)	45.8 (1.8)
Cultural diffusion	41.0 (1.4)	42.0 (2.0)	40.2 (1.7)	44.4 (1.5)	26.3 (2.4)	27.8 (3.6)	49.6 (2.9)	34.8 (2.8)	40.0 (3.2)	38.7 (2.2)
Environmental impact of thermonuclear war	40.6 (1.3)	48.5 (1.8)	33.7 (1.6)	43.3 (1.5)	27.6 (2.9)	27.4 (3.9)	43.9 (2.7)	33.9 (1.4)	41.1 (3.0)	42.9 (2.0)
Boundaries of present day African nations	35.9 (1.1)	41.3 (1.8)	30.9 (1.4)	37.4 (1.2)	27.7 (2.5)	31.0 (3.2)	40.0 (2.1)	31.1 (1.8)	31.9 (2.3)	40.0 (2.4)
World trade of industrial products	35.3 (1.0)	38.3 (1.5)	32.5 (1.5)	36.7 (1.2)	26.7 (3.2)	32.7 (3.4)	35.5 (1.9)	30.1 (2.0)	36.6 (2.2)	38.4 (2.1)
Average Percent Correct on Cultural Geography Items	**59.5 (1.2)**	**62.5 (1.7)**	**56.8 (1.6)**	**62.8 (1.4)**	**45.0 (3.1)**	**49.7 (4.0)**	**61.2 (2.6)**	**55.3 (2.2)**	**60.8 (2.3)**	**60.2 (2.3)**
Physical Geography										
Weathering and soil erosion	72.2 (1.4)	75.0 (1.4)	69.6 (1.6)	75.2 (1.4)	62.4 (4.1)	60.5 (3.6)	73.0 (2.1)	68.8 (2.7)	73.7 (2.6)	73.1 (3.1)
Hawaiian Islands were formed by volcanism	71.1 (1.2)	77.3 (1.5)	65.5 (1.5)	75.5 (1.4)	51.3 (2.8)	57.8 (4.2)	69.7 (3.0)	68.7 (2.3)	74.9 (2.0)	70.8 (2.3)
Meaning of the term "climate"	70.0 (0.9)	72.0 (1.7)	68.2 (1.5)	74.3 (1.1)	53.4 (2.6)	57.5 (3.9)	70.6 (1.8)	64.9 (1.8)	73.2 (1.9)	71.0 (1.7)
Cause of seasons	68.2 (1.2)	67.8 (1.8)	68.6 (1.4)	72.7 (1.3)	49.6 (3.1)	56.3 (4.1)	65.9 (3.5)	63.9 (2.1)	72.4 (1.6)	70.4 (2.0)
Evidence of faulting	60.0 (1.5)	69.6 (2.1)	51.4 (2.0)	64.7 (1.7)	42.4 (3.4)	51.8 (4.0)	57.2 (3.4)	56.8 (2.3)	60.8 (1.5)	65.0 (4.6)
Formation of sedimentary deposits	59.7 (1.2)	58.2 (1.9)	61.1 (1.7)	63.1 (1.5)	47.6 (3.4)	48.7 (3.3)	60.6 (3.1)	55.1 (2.3)	60.1 (1.4)	62.7 (3.0)
Describe the climate of a region	58.7 (1.3)	62.9 (2.1)	54.9 (1.9)	64.6 (1.5)	32.4 (2.9)	47.8 (4.3)	63.3 (2.4)	51.1 (2.5)	62.2 (2.0)	57.5 (2.9)

Standard errors are presented in parentheses

Performance in Geographic Content and Skill Areas

PERCENTAGE OF STUDENTS RESPONDING CORRECTLY

Physical Geography (cont'd)	**Nation**	**Male**	**Female**	**White**	**Black**	**Hisp**	**NEast**	**SEast**	**Cent**	**West**
Stream erosion causes V-shaped valleys	56.4 (1.1)	61.1 (1.6)	52.0 (1.3)	62.2 (1.3)	34.6 (3.6)	38.9 (3.0)	56.0 (2.5)	48.9 (1.9)	61.1 (2.1)	58.8 (2.4)
Identify a region based on climatic data	50.6 (0.9)	53.4 (1.4)	48.3 (1.5)	50.8 (1.0)	46.4 (2.6)	53.6 (4.0)	48.0 (1.9)	51.6 (2.1)	50.0 (1.2)	53.2 (2.4)
Sea level rising due to global warming and melting of polar ice cap	50.1 (1.3)	60.4 (1.8)	40.9 (1.7)	54.2 (1.6)	30.3 (2.5)	42.3 (3.5)	54.2 (3.2)	49.3 (2.2)	48.1 (3.1)	48.7 (1.7)
Greatest rainfall occurs on the windward slope of a mountain	42.7 (1.2)	44.9 (1.9)	40.8 (1.6)	41.7 (1.3)	46.1 (2.6)	48.1 (4.2)	44.2 (2.5)	43.6 (1.7)	39.9 (1.9)	43.2 (3.0)
Rising atmospheric pressure usually indicates dry and sunny weather	30.5 (1.3)	33.7 (1.8)	27.7 (1.8)	28.5 (1.4)	35.2 (3.8)	37.4 (3.4)	36.0 (2.7)	30.4 (2.5)	26.9 (2.2)	29.0 (2.3)
Average Percent Correct on Physical Geography Items	**57.5** **(1.2)**	**61.4** **(1.8)**	**54.1** **(1.6)**	**60.6** **(1.4)**	**44.3** **(2.2)**	**50.1** **(3.8)**	**58.2** **(2.7)**	**54.4** **(2.2)**	**58.6** **(2.0)**	**58.6** **(2.6)**
Average Percent Correct on All Assessment Items	**57.2** **(0.6)**	**61.3** **(0.8)**	**53.5** **(0.6)**	**60.5** **(0.7)**	**42.5** **(0.8)**	**48.0** **(1.6)**	**58.5** **(1.5)**	**52.9** **(0.9)**	**58.8** **(0.8)**	**58.2** **(1.0)**

Standard errors are presented in parentheses.

Acknowledgments

This report is the culmination of effort by many individuals who contributed their considerable knowledge, experience, and creativity to NAEP's geography assessment, from developing and conducting the assessment to analyzing and reporting the results.

Under the NAEP grant to Educational Testing Service, Archie Lapointe served as the project director and Ina Mullis as the deputy director. Statistical and psychometric activities were led by Albert Beaton, with consultation from Robert Mislevy. John Barone managed the data analysis activities; Jules Goodison, the operational aspects; and Walter MacDonald, test development. Kent Ashworth managed communications with the general public and participating schools. Sampling and data collection activities were carried out by Westat, Inc., under the supervision of Morris Hansen, Keith Rust, Rene Slobasky, and Nancy Caldwell. The 1988 geography assessment of high-school seniors was made possible by special funding from the National Geographic Society.

Emerson Elliott, Acting Commissioner, National Center for Education Statistics (NCES) provided consistent support, as did members of his staff — in particular, Eugene Owen, Gary Phillips, and David Sweet.

The 1988 geography assessment was assembled by Sheila Ager and Anu Bhasin. The analyses reported herein were managed by Norma Norris, assisted by Kate Pashley. The report was written and organized by Ina Mullis and Walter MacDonald of ETS, with Russ Allen, Supervisor of Test Development for the Wisconsin Department of Public Instruction; Norman Bettis, Professor of Geography at Illinois State University; Dana Kurfman, Prince Georges County Schools, Landover, Maryland; and Christopher Salter, Chair of the Department of Geography of the University of Missouri in Columbia.

Extensive editorial assistance and collaboration were provided by Lynn Jenkins and Mary Foertsch of ETS, and by Marianne Kenney of the Cherry Creek School District in Denver, Colorado. Special thanks for the completion and production of this report are due to the many NCES and ETS reviewers who suggested improvements. Beverly Cisney, Alice Kass, and Rosemary Loeb provided the excellent word-processing skills essential to the project, Jan Askew coordinated production efforts, Jack Weaver designed the report's cover, and Red Flannel was responsible for the report's interior design.

Finally, and above all, NAEP is grateful to the students and school administrators whose participation in the geography assessment made this work possible.

[illegible] • Printed in U.S.A.

THE GEOGRAPHY LEARNING OF HIGH SCHOOL SENIORS REPORT CARD, 1988

COMMENTERS

Harvey Brandt, Teacher
3704 Halibut Point Road
Sitka, Alaska 99835
(907) 747-6447

John Brierley, Teacher
2420 Silver Strand Avenue
Formosa Beach, California 90254
(213) 373-1567

Peggy Steele Clay, Teacher
Geography
P.O. Box 2508
Florence, Alabama 35630
(205) 766-6529

Dr. David Hill, Professor
Center for Geography Education
University of Colorado
Guggenheim Building, Box 260
Boulder, Colorado 80309
(303) 492-6760

Sid Jumper, Professor
Department of Geography
University of Tennessee
Knoxville, Tennessee 37996-1420
(615) 974-2418

Martha Sharma, Teacher
3508 Sterling Avenue
Alexandria, Virginia 22304
(203) 537-6371

Joe Stoltman, Professor
Department of Geography
Western Michigan University
Kalamazoo, Michigan 49008
(616) 387-3429

Fred H. Walk, Teacher
Rural Route 1, Box 276
Towanda, Illinois 61776
(309) 728-2188

Dana Kurfman, Social Studies Supervisor
Prince George's County Public Schools
14201 School Lane
Upper Marlboro, Maryland 20772
(301) 386-1502

Joan M. Longmire, Teacher
59 Devonshire Circle
Elgin, Illinois 60123
(312) 697-7731

TO: DR. SHIRLEY A. JACKSON
FROM: HARVEY BRANDT
RE: COMMENTS ON GEOGRAPHY LEARNING OF HS SENIORS REPORT CARD/88
DATE: JANUARY 28, 1990

As a middle school social studies teacher I definitely see the need for quality, focused geographic education. This report helps focus on that need and I hope that it will stimulate legislative action at the state and national level for more funding, and provide the education community with the foundation for an improved geography curriculum.

Specifically, the range, quality and conceptual level of the questions were appropriate for American high school seniors. I remain skeptical of all standardized tests, never-the-less, all of the geographic concepts covered in this assessment are necessary elements in the education of any high school Senior. If Americans are to compete with other nations in the global marketplace certainly geographic education must be a priority in the American high school curriculum.

What is to be done? An already overtaxed curriculum (certainly true in many school districts) does not need another course. Quality education is not enhanced by adding courses. The data from this report suggest that geographic concepts must skillfully be integrated into existing social studies courses in a carefully focused manner. This does not mean that geography courses could not be added. Many school districts need to carefully assess their curriculum and see if deficiencies in geographic education would necessitate the inclusion of a geography class.

Not only should geographic education be integrated with other social studies courses, but also with science and English courses. Clear understanding of environmental issues will only occur if students are given the opportunity to explore these problems in a manner that allows the time for focused, in-depth research that is community based and directly related to the students maturity level. This study clearly states the need for better understanding of environmental issues by American high school students. These complex, demanding issues can be addressed only if the curriculum reflects the needs of contemporary global society.

This study also raises a serious question about who teaches geography in American high schools. How are teachers assigned to teach courses in American high schools? Are they assigned to their area of expertise?
Are GEOGRAPHY TEACHERS teaching geography in American schools
This will directly impact the quality of geographic instruction received.

Clearly this report implies the need for greater financial support from the various state legislatures and the US Congress. American education will be competitive in the global marketplace when American teachers salaries are competitive in the American professional workforce. Also, quality geographic education requires classroom equipment and materials and these items are costly

Perhaps many of the seniors who answered these questions incorrectly were not exposed to globes, current maps, quality science laboratory equipment and properly sized classes to take full advantage of the instruction offered.

The 1988 NAEP geography assessment raises some serious questions about the geographic ignorance of many American high school students. Educating informed global citizens reflects a clear need for quality geographic education. achieving this education requires more than general condemnation of America's public schools, it requires financial commitment, curriculum reform and broad support for this endeavor to succeed.

UNIVERSITY OF CALIFORNIA, LOS ANGELES
UCLA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO
SANTA BARBARA • SANTA CRUZ

GRADUATE SCHOOL OF EDUCATION

OFFICE OF THE EXECUTIVE DIRECTOR
CENTER FOR ACADEMIC INTERINSTITUTIONAL PROGRAMS
GAYLEY CENTER
405 HILGARD AVENUE
LOS ANGELES, CALIFORNIA 90024-1372

January 30, 1990

Dr. Shirley A. Jackson
Associate Commissioner for Dissemination Policy
National Center for Education Statistics
555 New Jersey Ave. N.W.
Washington, D.C. 20208-5574

Dr. Jackson,

The Nation's Report Card on Geographic understanding underlines and confirms previous requests on the subject. Only a fraction of America's graduating seniors have a depth of knowledge and processing skills related to geography.

The student successes seem focused on locational skills to the exclusion of more meaty, analytical and interesting processes. This focus is a result of the lack of recency of instruction shown in table 6.4. If a student has not been working in the area it is hard to be competent or confident.

The lack of understanding of cultural matters shown in table 4.1 is alarming. Only 64% being able to intrepret the factors involved in locating a business and less than that comprehending traffic flow in urban areas is horrendous.

This report suggests that 1994 will be a year to look forward to. By that year the National Geographic Society's Alliance movement will have affected more teachers and students across the nation. The efforts of these educators should bring profound change.

Sincerely,

John Brierley

John Brierley

COMMENTS

Peggy Steele Clay
Florence City Schools
Florence, Alabama

> ... it is sad ... not only can Johnny not read, he does not know where he is and he cannot find a book to read ... however, I see light at the end of the tunnel, public rage will demand that action be taken ... through the Alabama Geography Alliance, (partnership of the State Department Education and the National Geographic Society) - geography lessons are diffused throughout the curriculum - K-12.

Commentary on
The Geography Learning of High School Seniors

by
Professor A. David Hill
Department of Geography
University of Colorado at Boulder
January 30, 1990

The Geography Learning of High School Seniors reports on the results of a nationwide study of over 3,000 twelfth-grade students in 1988. Most importantly, this assessment is significant because it provides a basis from which to measure future achievement in geographic knowledge and understanding. Any significant changes in results between 1988 and 1994 (the next NAEP geography survey) will of course raise questions about why those changes occurred. The two studies cannot, because of their limitations, answer such questions, but they may suggest certain lines of investigation.

The findings of the 1988 study are not surprising. They reinforce what we have already learned from a host of studies and surveys over the last decade: students generally lack knowledge and understanding of geography. Moreover, the 1988 study confirms again the fact that most students do not take geography courses in high school.

The 1988 study is an improvement over the numerous other surveys referred to above in that it is more comprehensive: it is a better representation of the whole of the subject matter of geography than were previous surveys. Most previous surveys were limited to simple recall of locational knowledge, what is sometimes called "place-name geography." Critics of those surveys rightly noted that we must not allow mere knowledge of place location to be the measure of geographic education.

Although the NAEP study still devotes, in my opinion, too many questions to "place-name geography," it does provide a start at revealing the difference between factual recall of locational knowledge and geographic understanding. For instance, the report indicates that students "did not seem to understand that maps can be used to derive all kinds of information about the world, rather than simply to find places." Indeed, the study tells us that, in general, student knowledge is superficial, that it is limited to awareness and does not extend to in-depth understanding. For example, although many students were aware of environmental issues, few of them appeared to understand these issues.

This nation cannot afford inferior geographic education and its outcome: a general lack of geographic understanding. The 1988 NAEP study is a reliable reminder that we have much more to do in using geography to enhance the quality of American education. New instructional approaches and improved educational materials are important ingredients in this endeavor.

THE UNIVERSITY OF TENNESSEE
KNOXVILLE

College of Liberal Arts

Department of Geography

January 30, 1990

Dr. Shirley A. Jackson
Associate Commissioner for Dissemination Policy
National Center for Education Statistics
555 New Jersey Avenue, NW
Washington, DC 20208-5574

FAX (202) 357-6466

Dear Dr. Jackson:

The Geography Learning of High School Seniors Report Card, 1988, contains little that is surprising for those involved in teaching geography at the university level. A few observations, however, may be in order.

The simplistic nature of many of the questions on the test is, in itself, indicative of the low expectations concerning knowledge of geography by high school seniors. It also suggests that those preparing the test were cognizant of the low level of preparation in geography of most teachers who teach geography, social studies, and earth science courses in the nation's schools. At least 30 percent of the questions could probably have been answered correctly by an average senior of normal intelligence who had never had a geography course nor a course that purported to contain geographical content.

That students who had taken a geography course did little better than those who had had no preparation in geography, per se, is evidence that: 1) most geography courses are poorly taught; 2) those who teach the courses are poorly prepared in geography; 3) those who take such courses are frequently the below average students looking for an easy credit; 4) much of what is taught as geography involves rather mindless memorization of places and largely outdated facts about places; and 5) most geography textbooks are boring collections of unrelated (by the authors) trivia rather than structured treatments of the general education qualities of geography and the analytical value of the geographical approach to understanding the major cultural and environmental issues confronting humankind today and in the future.

The results of the test also provide evidence that when geography is supposedly combined with other subjects, such as history, the geography content is ommitted. This reflects the fact that most social studies teachers are trained primarily in history, and that teachers teach what they know rather than what is in the official guidelines prepared by state education boards and curriculum committees. Label the course what you will, the content will usually be reflective of the teacher's prior preparation (whether history, football, or whatever).

Yours very truly,

Sidney R Jumper

Sidney R. Jumper
Professor and Head

408 Geography and Geology Building/Knoxville, Tennessee 37996-1420/(615) 974-2418

January 26, 1990

Dr. Shirley A. Jackson
Associate Commissioner for Dissemination Policy
National Center for Education Statistics
555 New Jersey Avenue, N.W.
Washington, D.C. 20208-5574

Dear Dr. Jackson,

I have read the 1988 NAEP geography assessment report with great interest. While the findings of this study are not surprising, they are no less distressing for their predictability. The report confirms that students in the United States are poorly equipped to deal with the skills, concepts, and basic knowledge of geography as a key discipline within the body of general education.

Variations in performance level based on region, gender, or race/ethnicity are significant if they vary greatly from patterns found in other subject areas. As noted in Chapter 7, such is not the case. It seems likely that these patterns reflect problems -- indeed serious problems -- in our educational system generally, and not problems specific to geography.

When taking into consideration the percentage of students reporting "some" or "a lot" of exposure to various areas of geographic knowledge, performance percentages are disturbingly low. Such percentages would be unacceptable in other disciplines, and should be equally unacceptable in geography as well. Such levels of achievement suggest that the quality of "exposure" is seriously lacking. Reports and recommendations by other groups notwithstanding, geography instruction integrated with history and other social studies is not, alone, sufficient. There needs to be a place in the high school curriculum for geography as a distinct and separate focus of study; a time which affords students the opportunity to discover and use geographic skills and concepts to examine and address issues which may well shape the direction of their lives.

If we value geographic understanding -- and we must in our increasingly interdependent world -- we must provide our students with a solid foundation in geographic perspectives and methods. This means that geography must have its own place in the curriculum, and be taught by well-trained teachers. The NAEP report represents a valuable instrument for advancing the cause of geography education. If the United States would lead the world, we have to be able to find it and recognize our place in it.

Sincerely,

Martha B. Sharma

Martha B. Sharma
Geographer/Educator
Washington, D.C.

Department of Geography

Kalamazoo, Michigan 49008-5053

WESTERN MICHIGAN UNIVERSITY

January 29, 1990

Dr. Shirley A. Jackson
Associate Commissioner for Dissemination Policy
National Center for Education Statistics
555 New Jersey Avenue, N.W.
Washington, D.C. 20208-5574 (2023576466)

Dear Dr. Jackson:

The data in the Report on the Geography Learning of High School Seniors reveal yet another sad chapter in an increasingly long litany on American youth and their ignorance about the geography of the world in which they live.

While disappointing, the results of the Report were not surprising. Evidence going back to 1983, and earlier, has shown that elementary students were not learning geographic content and skills adequately enough to be considered geographically literate. The data in the Report reveal that an additional five years of schooling has not improved the geographical knowledge of students.

The implications of the Report are that schools have a success rate of 50 to 60 percent in geography. That rate of success is not acceptable as we enter the final decade of this century, and as the world becomes increasingly interconnected due to changes in the human and physical conditions on our planet.

Among the many messages revealed in the report, two seem extremely important in terms of action. First, students are leaving school without basic knowledge. Knowledge is the basis for responsible action in our democracy. Citizens cannot respond effectively to public issues ranging from land use to international trade patterns unless they have information about the world, its people and natural condition, on which to base judgments.

Second, the general lack of basic map skills, not only map reading, but the skills necessary in applying information from maps is badly in need of improvement. Students are not able to use maps and atlases to examine, compare, and analyze information. Maps and map usage must be incorporated in school if students are to develop lasting mental images of the world.

The 1988 data are educationally practical because they tell us that the status of geography must be enhanced, especially in the high school, if its essential contributions to an informed citizenry are to be realized.

Sincerely yours,

Joseph P. Stoltman

Joseph P. Stoltman
Professor of Geography

January 31, 1990

Dr. Shirley A. Jackson
Associate Commissioner for Dissemination Policy
National Center for Education Statistics
555 New Jersey, N.W., Washington, D.C.

Dear Dr. Jackson:

I found The Geography Learning of High School Seniors Report Card, 1988 replete with useful information. The Report obviously reinforces the claim that high school seniors lack a solid geography education. As a high school geography teacher, I find the results quite alarming. Many of the previous surveys attempting to measure geographic knowledge tended to focus solwy on the locational aspect of geography. This report certainly reinforces students lack of understanding of where cities and countries are located. More importantly, the assessment reveals that high school seniors lack an understanding of the basic concepts of physical and cultural geography. As an educator, I am very disturbed that we are graduating a large percentage of students that have such a shallow global perspective. Citizens of this country can't vote intelligently unless they understand basic concepts of physical and cultural geography.

It was very interesting that the findings showed little correlation between performance on the assessment instrument and geography course-taking. Perhaps this reveals something about the methods that are being utilized to teach geography classes. Meaningful learning will not take place if students are taught using a rote method that involves simple recall of information. I believe educators need to assess the methodology being deployed when teaching geography. Strategies involving students in the critical thinking process should (hopefully) reveal more learning. Students not performing well on the locational items on the instrument, even though location was emphasized, might further substantiate the claim that an active, reflective approach toward teaching is paramount for the occurrence of meaningful learning. The lack of relationship between course taking and proficiency might reveal that geography should be integrated within the curriculum (within U.S. History and World History classes) as opposed to being segregated.

The findings reveal that the news media seems to have an impact on students geographic awareness. It is apparent that teachers need to utilize the media as a means to enhance the learning of geographic concepts.

These findings should cause educators to re-evaluate how geography is offered in the curriculum and the methodologies being utilized when teaching geography classes. I am extremely concerned that high school seniors know so little about an increasingly interdependent world. Much cooperation will be needed to restore geography at the forefront of American education.

Sincerely,

Fred Walk

Fred H. Walk
High School Geography Teacher
Normal Community High School
303 Kingsley Avenue
Normal, Illinois 61761

Prince George's County Public Schools
14201 SCHOOL LANE
UPPER MARLBORO, MARYLAND 20772

William Paca Instructional
Services Center
7801 Sheriff Road
Landover, MD 20785

February 1, 1990

MEMORANDUM

TO: Dr. Shirley A. Jackson
National Center for Education Statistics

FROM: Dana Kurfman, Social Studies Supervisor
Prince George's County(MD) Public Schools

RE: Implications and Usefulness of 1988 NAEP Geography Results

The major implication I derive from the report on "The Geography Learning of High School Seniors" is the need for schools to improve geographic learning. Having NAEP data reaffirm the sad state of geographic knowledge should prove useful in efforts to increase emphasis on geographic education in American schools. This means more geography courses, more emphasis on where events take place in history courses, and more resources, such as maps in all classrooms.

NAEP data should provide support for continuing our school system's required ninth grade course in world geography. It should also encourage public support in expanding the geography-based curriculum now being implemented in ten Academic Center Magnet schools.

NAEP's documentation of the low level of student place location knowledge serves to highlight the importance of knowing where things happen in the world. True, a great majority of students can locate Canada and the Soviet Union on a world map. But only 42% could locate Nigeria, by far the most populous nation in Africa; and only 37% could locate Southeast Asia. This and other NAEP data suggest that much more attention must be given to Africa, Asia and Latin America in our geography and history courses.

Having an accurate mental map of the world certainly is basic to understanding historical and contemporary events. Wall maps in every classroom, with teachers who will use them effectively, is a necessary first step. An important second step is helping teachers use maps so locational information becomes a part of each student's mental picture of the world. Only then will American students have the ability to understand present day events and subsequently to influence future world events.

Joan M. Longmire
59 Devonshire Circle
Elgin, Illinois 60123

January 28, 1990

Dr. Shirley A. Jackson
Associate Commissioner for Dissemination Policy
National Center for Education Statistics
555 New Jersey Avenue, N.W.
Washington, D.C. 20208-5574

Dear Dr. Jackson:

I have been contacted to provide written comments on The Geography Learning of High School Seniors Report Card, 1988. I have been teaching Geography and Social Studies for 23 1/2 years, mainly at the 7th grade level. I have a Master's Degree in Geography from the University of Wisconsin. I am a graduate of the National Geographic Society's Summer Geography Institute and teach a geography course for teachers as an adjunct faculty member of the National College of Education, Lombard, Illinois campus.

I thought the test was very rigorous and comprehensive. I do not know what the expected level of learning should be, but the results seem to be low. I don't consider this surprising given the few courses in geography taken by students at any level, not just high school. In fact, I was surprised by the percentage of students who stated that they had taken a geography course in high school (64 percent). It would have been a good idea to give some comparison between tests in geography and another social science such as history. It is hard to gauge what is considered "low" on a test like this.

I am dismayed by the statistic that shows that students who have had a course in geography in high school scored no better than those who had not. This raises some questions in my mind. First, what is the content of the courses they took and how does that compare to this test? Did they have a full year or a one semester course?

Second, what is the academic level of the student taking the course? In my school district, college bound students are steered into world history, non-college bound into geography. The physical geography course, called Earth Science, is for the students who can't make the grade in biology, chemistry or physics. World Geography is an elective so the teachers "dummy down" the course to attract enrollment. I wonder how universally true this practice is.

Third, what states require a geography course of all graduating students? I wonder if the test scores of the students in those states would show that students who took the course fared better than those who didn't. In those states geography would be a more rigorous course because it would be taken by the full cross section of students including the college-bound. If many of the western states required geography, the fact that they scored better could be attributed to their having had a "good" course in geography.

Fourth, how well trained in geography is the teacher of the course? If geography is an elective, rather than required, there are only a few sections of the course. The history trained teacher may teach one or two sections of geography. The amount of geography course work required for that teacher to be certified would be minimal. The old joke is that the geography course was taught by the football coach. Students can't learn much from a teacher who doesn't know much.

I think the test results show that students need to learn more geography. Geography ought to be required and taught by a teacher with more than a course or two in college geography. I think a rigorous course in geography needs to be designed to teach students geographical thinking and problem solving. Many world regional courses taught today cover too much land area with little depth of understanding.

Sincerely,

Joan M. Longmire

Joan M. Longmire

PRESS CONFERENCE

February 7, 1990

NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS (NAEP) THE GEOGRAPHY LEARNING OF HIGH SCHOOL SENIORS REPORT CARD, 1988

11:00 a.m. CONVENING THE CONFERENCE
Christopher T. Cross
Assistant Secretary for Educational Research and Improvement

COMMENTS
Lauro F. Cavazos
U.S. Secretary of Education

CONFERENCE CHAIR
Emerson J. Elliott
Acting Commissioner
National Center for Education Statistics

11:10 a.m. DATA SUMMARY
Ina V.S. Mullis
Deputy Director, NAEP
Educational Testing Service

11:25a.m. DATA INTERPRETATION
National Geographic Society
Gilbert M. Grosvenor
President
National Geographic Society

Dr. Floretta McKenzie
The McKenzie Group
National Geographic Society Board
Former Superintendent of Schools for the District of Columbia
Former geography teacher

National Assessment Governing Board (NAGB)
Mark Musick
President
Southern Regional Education Board
Atlanta, Georgia

Dr. David Battini
High School History Teacher
Cairo, New York

Honorable Michael N. Castle
Governor of Delaware
Wilmington, Delaware

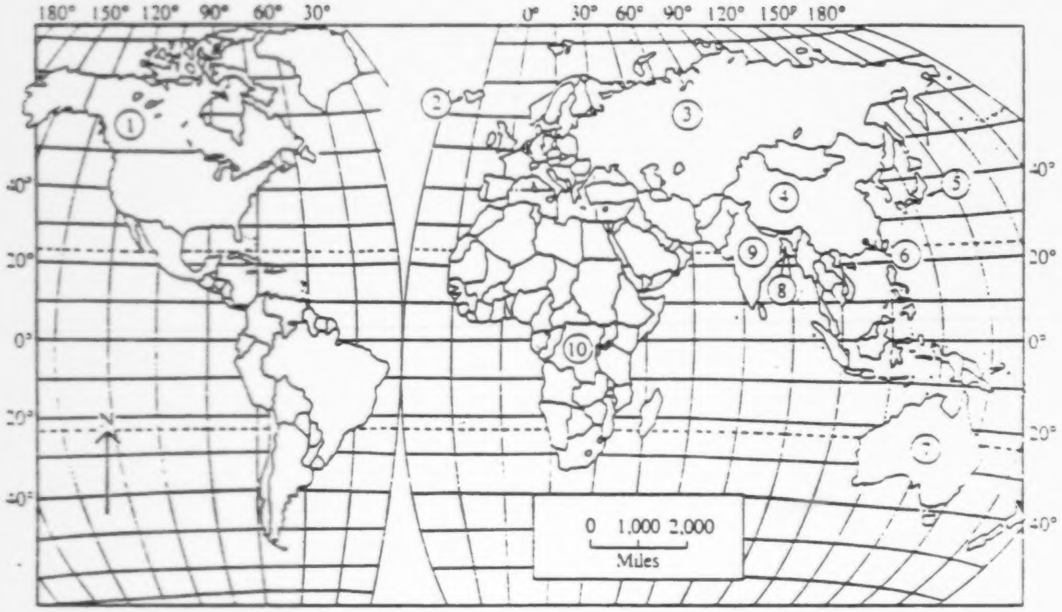
11:40 a.m. QUESTIONS and ANSWERS

Press Packet Materials

The Geography Learning of High-School Seniors

The National Press Club
February 7, 1990

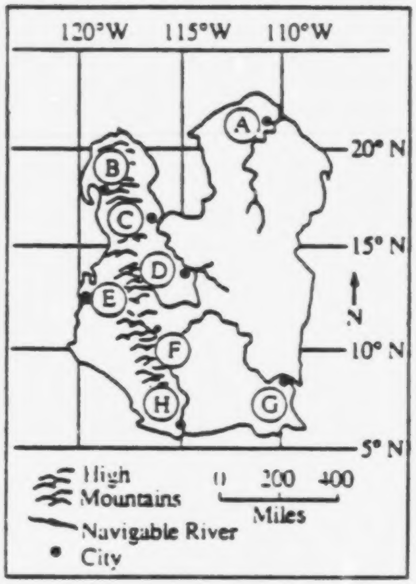
LOCATION


180° 150° 120° 90° 60° 30°
0° 30° 60° 90° 120° 150° 180°
40°
20°
0°
20°
40°
N
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
0 1,000 2,000
Miles

85 %	**Recognized the Soviet Union on a world map**

* * *

58 %	**Identified Jerusalem on a regional map**
50 %	**Knew the Panama Canal cut sailing time between New York and San Francisco**


120°W
115°W
110°W
20° N
15° N
10° N
5° N
A
B
C
D
E
F
G
H
N
High Mountains
Navigable River
City
0 200 400
Miles

58 %	**Identified cities with similar longitude**

* * *

55 %	**Knew the prime meridian was at 0° longitude**
27 %	**Could identify likely areas of soil erosion using maps of elevation and rainfall**

CULTURAL GEOGRAPHY

79 %	Understood how to control acid rain
69 %	Identified an environmental risk of using pesticides
59 %	Knew the impact of cutting down rain forests
53 %	Identified a cause of the greenhouse effect
41 %	Recognized the environmental impact of thermonuclear war

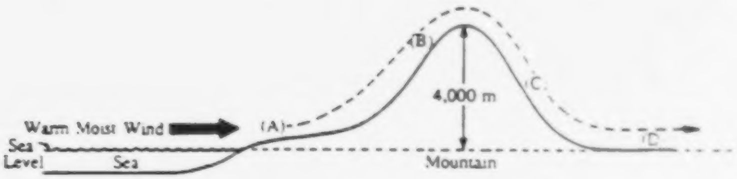
PHYSICAL GEOGRAPHY

68 %   Knew the causes of the Earth's seasons

60 %   Recognized faulting in a cross-sectional diagram of the Earth's surface

* * *

43 %   Knew annual rainfall would be greater on the windward side of a coastal mountain


(B)
(C)
4,000 m
Warm Moist Wind
(A)
(D)
Sea Level
Sea
Mountain

Which of the following lettered regions shown in the diagram above would have the greatest annual precipitation?

A A

B B

C C

D D

SENIORS' REPORTS OF COURSE-TAKING

* 64 % reported having any type of geography coursework in grades 9-12

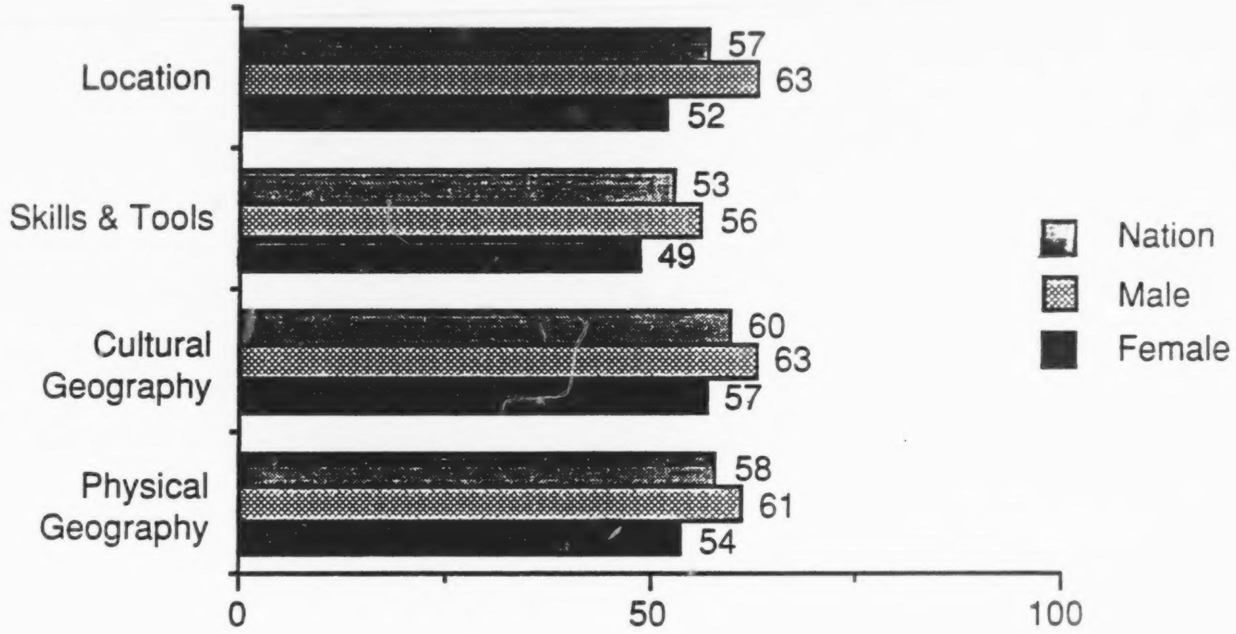
* Geography course taking per se was not related to better performance on NAEP

* Those reporting more study of:

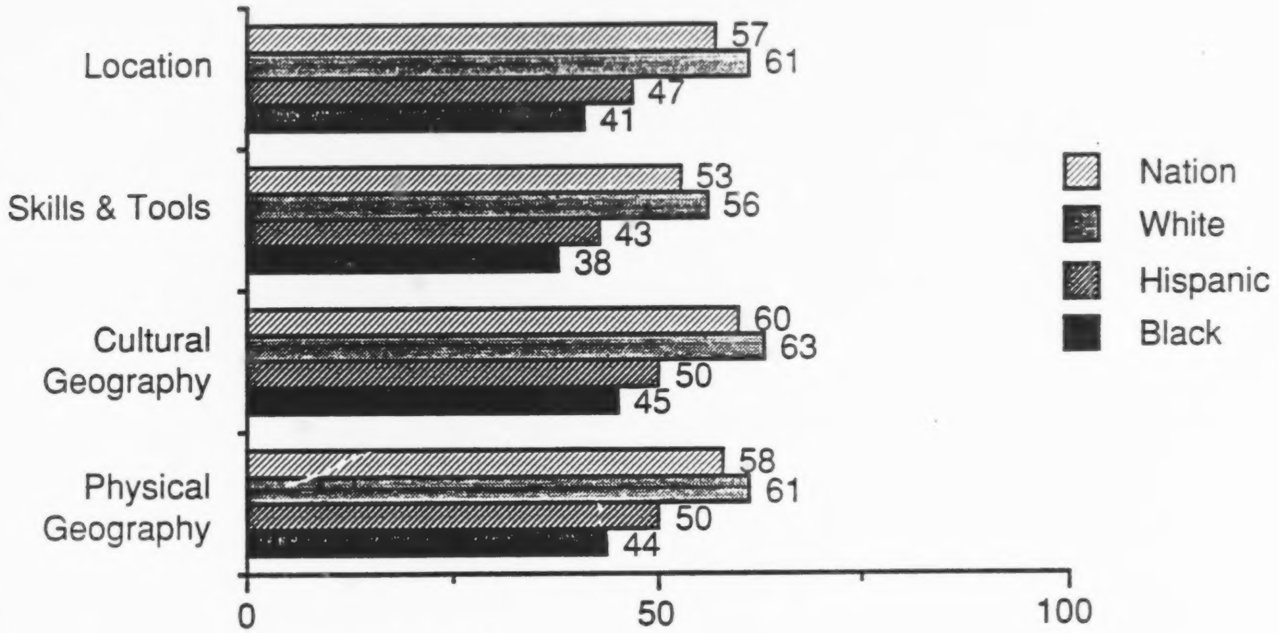
Locations
Physical Geography
Geography Skills

... tended to perform better on those types of questions

Average Geography Performance by Gender



Average Geography Performance by Race/Ethnicity



THE BEST PERFORMERS:

* Were from the Central, Northeast, and Western Regions of the country

(Students from the Southeast performed less well)

* Had taken Academic high school programs rather than General or Vocational/Technical programs

* Reported at least 2 hours of Homework--and at least 16 pages of School Reading--each day

* Reported watching television 2 hours or less each day and working part-time 20 hours or less each week

UNITED STATES
DEPARTMENT OF EDUCATION NEWS

FOR RELEASE
February 7, 1990

Contact: Jane Glickman
(202) 732-4307

CAVAZOS ISSUES GEOGRAPHY ASSESSMENT AND HANDBOOK FOR PARENTS

U.S. Secretary of Education Lauro F. Cavazos today deplored the "disturbing geography knowledge gap" in America as he released the results of the first National Assessment of Educational Progress (NAEP) in geography.

Overall, the nation's 12th graders responded correctly to only 57 percent of the geography test items.

"Unless we place a new emphasis on the study of geography," Cavazos said, "we are passing on to our children the stewardship of a world they literally do not know."

Cavazos also announced that the Education Department is issuing a handbook for parents, Helping Your Child Learn Geography. "It contains a wealth of ideas," Cavazos said, "about activities parents can use to teach their children basic facts about world geography.

"We recognize the importance of geography and the need to foster in young children an early appreciation of the world around them. We believe this booklet can help make a difference."

Citing suggestions contained in the handbook, Cavazos said parents should join their children to "watch weather forecasts together. Read about other cultures and countries to make your children aware of the diversity of people and geography. Have a map or world atlas handy in your home so that family discussion or television programs can become daily geography lessons."

-MORE-

More than 3,000 high school seniors from 300 public and private schools participated in the NAEP study. Students were asked a total of 76 multiple-choice questions about four major geographic topics:

- knowing locations;
- using the skills and tools of geography -- such as maps and globes, latitude and longitude;
- cultural geography -- including environmental issues and economic factors; and,
- physical geography -- climate, weather, tectonics, and erosion.

While 87 percent of the students could locate Canada on a map, only 27 percent could use a map to identify a likely area of soil erosion. Average scores for the topics ranged from 53 percent correct in the geography skills category to 60 percent correct on cultural geography.

Despite the highest score on cultural geography, it was the only category of the four in which students who studied the topics a lot scored no better than students who studied them some or a little. One explanation is that students were familiar with many of these issues -- such as acid rain and the impact of pesticides on pollution -- because they have received considerable attention by the media.

Often referred to as "the nation's report card," NAEP is a federally-funded activity that regularly evaluates reading, writing, science, mathematics, and other subject skills. The 1988 geography assessment was made possible by partial funding from the National Geographic Society.

-MORE-

The handbook released today, Helping Your Child Learn Geography, provides practical ideas and activities for parents to use to introduce young children to five major geographic themes: physical locations, the character of places, relationships between places, movement of people and things, and how places can be described or compared.

The booklet encourages parents to:

- -- use or make maps to teach children about mountains, lakes, terrain and other physical characteristics of places; directions and routes taken on family trips; locations mentioned in books, newspapers, and on television, and where friends and relatives reside.
- -- construct weathervanes, barometers, and wind chimes and study weather forecasts over time to help children learn how climate affects crops, what people eat, how they dress, and what they do for work and fun.
- -- engage children in activities to show the extent to which people control and are controlled by the environment -- visit farms, reservoirs, and gardens; have them clean up litter, mow the grass, and rake leaves; discuss why we build bridges, tunnels, storm walls, and houses on stilts.
- -- use a variety of modes of transportation and communication to teach children about the movement of people, products, and ideas. Where do foods come from and how are they processed, transported, preserved, and brought to our kitchen tables? How has this changed since their grandparents were children?
- -- visit ethnic, commercial, and undeveloped regions of your hometown to help children understand how places, countries, and cultures can be compared and described.

The handbook also contains a glossary of terms and lists sources for obtaining maps, pen pals, atlases, and some 50 books for children about the environment and other cultures and areas of the world.

Copies of Helping Your Child Learn Geography are available for 50 cents per copy by writing: Geography, Consumer Information Center, Pueblo, Colorado 81009.

###

THE NATION'S REPORT CARD naep

National Assessment Governing Board

National Assessment of Educational Progress

FOR RELEASE
February 7, 1990

STATEMENT OF NATIONAL ASSESSMENT GOVERNING BOARD ON GEOGRAPHY LEARNING OF HIGH SCHOOL SENIORS

The results of NAEP's geography assessment are cause for great concern. Obviously, students must learn much more of the basic geography facts. But the data show an even more alarming problem: American high school seniors have a far too limited ability to apply the concepts of geographic knowledge. They have far too little understanding of the impact of climate and topography, of harbors and mountains, rivers and resources in shaping human history and culture and in defining many of the issues America confronts today.

The report does not suggest a need for "more courses." In fact, the students who took geography classes in high school performed virtually the same as those who did not. Rather, the results surely call for a hard look at how geography is being taught. They suggest developing more opportunities in high school and in the grades before it to study geography concepts and to help students see the relevance of geography and how to use it.

Certainly, geography is much more than simply knowing locations. But when only 37 percent of our high school seniors can locate Southeast Asia and only 43 percent can locate in order four major cities on our East coast there appears to be a problem that can't be brushed aside. This poor performance in locational geography is especially disappointing because the students surveyed list this aspect of the subject as the one which receives the most attention in their classes.

In the mid-nineteenth century, at least according to Horace Greeley, all the geography an American needed to know in order to do well was to know west from east and to go in the direction of the former.

Today, things are clearly not so easy. Names like Azerbaijan, Namibia, Lithuania, and Baku--to list but a few of the most obvious places--daily roll across the morning newspaper headlines. If students do not know geography well in this day and age, they cannot be fully literate or understand the great forces of world politics, economics, and religion which shape our lives.

1100 L Street, N.W.
Suite 7322
Washington, D.C. 20005-4013
(202) 357-6938

Sadly, too many young people leaving our schools today appear almost wholly illiterate in this regard. Some may be not even be able to follow Horace Greeley's advice for they're not sure of their east and their west.

In this geography assessment we see extremes. Eighty-four percent of the seniors recognized countries in the Middle East, yet only 37 percent were able to locate Southeast Asia. Eighty-five percent could recognize the Soviet Union but only 42 percent could locate Nigeria. Fifteen percent identified sub-Saharan Africa as part of South America. It is difficult to believe that fifteen percent of our seniors can actually make this mistake.

The cost of ignorance may well be severe. For example, the U.S. Department of Commerce estimates that 80 percent of all American-made goods now face international competition. By the end of this decade, the department estimates, nearly one-third of American corporations will conduct business abroad. But as former Virginia Governor Gerald Baliles said, "How are we to open overseas markets when other cultures are only dimly understood?" The Economist magazine has been even more blunt. "One reason Americans find it so difficult to do business with the rest of the world," the magazine said, "is that they are so ignorant of it." As the Business Higher Education Forum suggested last summer, "International ignorance is a luxury that America can no longer afford."

From this new Assessment and others NAEP has made it seems clear that the problems high school seniors have in geography are not isolated from shortcomings in other subjects. There seems to be a large fall-off in the percentage getting an item correct when questions require multi-step problem-solving and/or integration of knowledge. Higher-order thinking seems quite weak. The gap between whites and minorities is substantial; students in college prep academic programs outperform those in the general and vocational tracks; those who do less homework and watch more television get lower scores.

All these patterns are problems. Yet in geography, the data show, there is a larger problem as well. Very few of our high school seniors ever learn much geography as they move through the grades. That is a problem for all of us in a competitive world. It is also a pity for the students themselves because when geography is taught well it can be one of the most engaging subjects of all.

The following NAGB members are in substantial agreement with this statement:

Phyllis W. Aldrich
Francie Alexander
David P. Battini
Bruce E. Brombacher
Michael N. Castle
Saul Cooperman
Wilhelmina F. Delco
Victor H. Ferry
Chester E. Finn, Jr.
Michael S. Glode
Dale E. Graham
Carl J. Moser
Mark D. Musick
Carolyn Pollan
Matthew W. Prophet, Jr.
Richard W. Riley
Herbert J. Walberg

INDIVIDUAL COMMENTS BY MEMBERS OF THE NATIONAL ASSESSMENT GOVERNING BOARD ON THE GEOGRAPHY REPORT

Chester E. Finn, Jr. - NAGB Chairman; Professor of Education and Public Policy, Vanderbilt University

Nobody expected this assessment to yield cheery results. For years we've had evidence (albeit not so systematic or reliable) that young Americans know precious little about the geography of the world they live in. We are aware that boys and girls in other countries know more. We realize that our children don't study much geography in school--it is the great missing subject in today's social studies curriculum--and that they can graduate without having learned it. They can get into (indeed, can get a degree from) college without it. They can obtain a job. At no point in their young lives, it seems, are they actually obliged to learn much geography or rewarded for doing so.

This is a national embarrassment. It is part of the reason we're "at risk". And it is a pity for the children, themselves, not just because so many are growing up ignorant of important matters but also because geography is perhaps the most engaging subject of all. Not to study it is to forego a marvelous source of intellectual excitement and mental stimulation. The world is a fabulously varied and interesting place. Too many young Americans never learn that.

Dorothy K. Rich - President, Home and School Institute

The good news in this report is that you don't need native genius or special talents to learn geography. What it takes is work and effort--and all of our children ought to be able to do it.

The test results tell us that when students do homework and limit TV watching, they have higher geography scores. This isn't new, but it is an important reminder, like a bell tolling. If our students don't buckle down and make the effort to learn, that bell will be tolling for all of us.

Dale E. Graham - High School Principal (Retired), Columbia City, Indiana

Geography has not been given priority subject status in American schools for many years. As a matter of fact, geography has been absent and/or largely ignored in the curricular offerings of many high schools and a second class offering in middle-level and elementary schools.

We cannot expect to learn what we do not teach.

I believe many critics of the predictable outcome of not teaching geography have just recently become aware of the folly of their lack of support for the subject.

Saul Cooperman - Commissioner of Education, New Jersey

I'm discouraged. The report indicates that too many students don't really have a fix on where they are, or the whereabouts of others in the world. This knowledge seems critical in determining where this nation is going.

Michael Castle - Governor of Delaware

The NAEP geography results cause grave concern for America's future. The limited grasp our students have of geographical concepts will limit our ability to be full partners in the world economy. Beyond the implications the report has on this nation's ability to regain a competitive position in the world marketplace, it has serious implications to us as a nation and to each of our states.

Today's students represent the pool of persons from which we will get tomorrow's government leaders, policy analysts, program architects, as well as business persons. They also are the base for the concerned and informed citizenry who will be needed to support effective environmental policies and the factors that support economic development. Today's wrong answers may be forgivable but they could have disastrous results if they lead to tomorrow's ignorance.

Mark D. Musick - President, Southern Regional Education Board

The problem with what American high school seniors know or do not know about geography is not simply that they are unable to locate countries or cities on the map. In fact, they get fair marks for being able to identify the locations of major countries, cities, and landmarks. But they get poor marks on their understanding of the basic concepts of physical and cultural geography.

This can't be dealt with by an old-fashioned crash course. Instead, students must gain an appreciation of physical and cultural geography and the important role it plays in international politics and economics. If our students gain this knowledge, our nation will be far better prepared for the international competition we now face.

David P. Battini - High School History Teacher, Cairo, New York

It doesn't take much investigation of the assessment results to find that our students' understanding of geography is quite shallow. A reasonable response would be to reinstate geography courses as part of the junior high school curriculum.

I'm sure senior high school history teachers would appreciate getting students who had this formal preparation. As it is now, the history teachers must cover such large chunks of experience in such short chunks of time that geography gets lost. For example, in New York state teachers must cover the entire Western experience in one half-year semester; this may soon be reduced even more.

Without firm knowledge of geography our courses and our students both suffer. For geography is the playing field upon which history has been and is being played out. Imagine trying to follow a football game without knowing how the field is constructed.

Carolyn Pollan - Member, Arkansas House of Representatives

This last year I worked in a project that tested 101 young men between the ages of 16 and 21. Sixty-two out of the 101 could not tell us what countries are on the north and south borders of the United States, and 76 did not know what continent Brazil is on. I believe we functionally handicap our students with lecture-type classes which center on the ability to memorize facts and numbers. It's the same problem our ancestors had in looking at a flat piece of paper called a map and coming to the conclusion that we lived on a flat earth. In these days of video-oriented students, we have to find a way to bring curriculum alive. Our computer technology allows us to do this. Unfortunately, we are just not using it.

Victor H. Ferry - Elementary School Principal, Waterford, Connecticut

This latest NAEP Report Card provides ample rationale for elementary and secondary schools to review academic targets of what American students need to know in geography. If our nation's pupils are to be reasonably knowledgeable about our ever-changing world, the stakes of geography status as a prioritized basic skill must be raised.

We need to focus on improving the Nation's Report Card in all subjects. Prediction are this will occur as NAGB works toward arriving at widespread consensus on appropriate achievement goals for American students.

Matthew W. Prophet, Jr. - Superintendent, Portland, Oregon

The National Assessment of Educational Progress has once again demonstrated its great value to our nation by accurately revealing the extent and limitations of our high school seniors' geographic literacy. This well-designed and executed assessment challenges us all by showing that many of our nation's students have not mastered the important facts, understandings, and skills of geographic proficiency, in spite of having been taught them.

The most hopeful and positive aspects of the report are the students' familiarity with and grasp of environmental issues and their opportunities to learn geography in courses such as science and history. The finding that limiting both television-viewing and part-time work, and spending that additional time on homework improves achievement in geography is yet another clear message for the nation's parents eager to help their children succeed in school.

Carl J. Moser - Acting Director of Elementary and Secondary Schools, Lutheran Church-Missouri Synod

Students in U.S. schools do not know geography facts and have few geography facts and skills. At the elementary school level geography--and probably history--has been lost in the morass of social studies. In our country, where "global education" is an educational catch phrase, students don't have adequate information about their own country, much less others.

This report demonstrates an immediate, vital need to decide and agree on what students should know about geography and other subjects.

Religious-affiliated schools have a prime purpose of sensing and showing love to all people, regardless of their station or location in life. Love and compassion are usually based on knowledge and understanding of people. It is a rare person indeed who can love without some understanding or relationship with the other person. Religious schools have a special reason for re-emphasizing geography.

Phyllis W. Aldrich - Curriculum Coordinator, Saratoga Springs, New York

In the summary of results of the Geography Assessment we see, once again, evidence of the problem that American students "cover" a topic but don't learn it in a way that they can apply it. Even when one-third of the 12th graders report studying geography topics "a lot" and when over half report "some study", the results of the assessment reveal widespread lack of understanding of how to use and apply the facts they have studied.

Once again, as in the NAEP Reading and Writing Assessments, it is apparent that higher-level thinking skills are not being taught or learned. Understanding, applying, analyzing and comparing require not only exposure to facts, but practice in using them. No matter whether the concepts of geography are taught in a separate course or woven into other courses, the conclusion is clear. In our eight-hour world, and in a time of increasing global interdependence, our students are abysmally prepared. Changes in instructional methods must begin today.

For Release Feb. 7, 1990

THE GEOGRAPHY LEARNING OF HIGH SCHOOL SENIORS

NATIONAL CENTER FOR EDUCATION STATISTICS DATA SUMMARY

Emerson J. Elliott
Acting Commissioner of Education Statistics

Description of 1988 NAEP Geography Survey

Geography education encompasses not only the knowledge of physical characteristics of the Earth -- its topography, climate and weather patterns -- but also the complex interrelationships between people and their environment. The 1988 NAEP geography survey was conducted to determine what high school seniors actually know about four major geography topics: locations, using the skills and tools of geography, cultural geography, and physical geography. There were 76 geography items in the survey.

In total, 3,030 students in the 12th grade, randomly selected from 304 public and private schools, participated in the study. Since this is the first time NAEP assessed geography no trend information is available.

Performance on Geography Topics

The NAEP surveyed how much students knew in four geography topics. The major findings were

- The average 12th grade student could only answer 57 percent of the **location** items. This performance is surprisingly low given that locating places is taught more than any other geography topic in high-school.
  - o 85% recognized the Soviet Union on a world map.
  - o 83% of the students indicated they had studied the location of continents, oceans, rivers, mountains, states, cities, and countries.
  - o 58% identified Jerusalem on a regional map.
  - o 50% knew the Panama Canal cut sailing time between New York and San Francisco.
- The weakest geography topic for high school students was in the use of the **skills and tools** of geography. The average 12th grade student could only answer 53% of the items requiring them to understand map projections, and interpreting graphs and charts, and using latitude and longitude.
  - o 58% could identify cities with similar longitude.

    - 55% correctly defined zero degrees longitude as the prime meridian, although nearly one-third thought it was the equator.
    - 27% could identify likely areas of soil erosion.

- The average 12th grade student answered 60 percent of the **cultural geography** items. This implies that high school students do not have a good grasp of the reciprocal relationship between human culture and the environment. Students knew the most about environmental issues addressed in the news media.

    - 79% knew how to prevent acid rain.
    - 69% understood the impact of pesticides on pollution.
    - 59% knew the impact of cutting down rain forests.
    - 53% identified a cause of the green house effect.
    - 41% recognized the environmental impact of thermonuclear war.

- The average student only had a basic understanding (58% of the items correct) of the climate, weather, tectonics, and erosion--four important aspects of **physical geography**.

    - 68% of the students correctly identified the cause of seasons.
    - 60% recognized faulting in a diagram of the earth's surface.
    - 43% understood the process by which rain occurs.

- In each of the four geography topics males outperformed females, and white students out performed their black and Hispanic peers.

Geographic Topic	Average Percent Correct					
	Nation	Male	Female	White	Black	Hispanic
Location (24 items)	57	63	52	61	41	47
Skills and Tools (17 items)	53	56	49	56	38	43
Cultural Geography (23 items)	60	63	57	63	45	50
Physical Geography (12 items)	58	61	54	61	44	50

Overall Geography Proficiency

The patterns of responses to the test items were used to form a 0-500 scale on which to report average proficiency. Overall comparisons of average geographic proficiency showed that:

- White students performed better than Black and Hispanic students,
- Males performed better than females,
- Students in academic programs outperformed those in nonacademic programs, and
- Students in the Southeastern States performed less well than those in other regions.

Nation and Subgroup	Average Proficiency
Nation	293
Race/Ethnicity	
White	301
Black	258
Hispanic	272
Gender	
Male	301
Female	286
Region	
Northeast	295
Southeast	283
Central	298
West	295
High School Program	
Academic	304
General	278
Vocational/Technical	276

Geography Courses in High School

In order to assess the extent to which American students take courses in geography per se as a part of their high-school curriculum, NAEP collected data on geography course taking patterns. It was found that:

- Nearly two-thirds (64%) of the high-school seniors reported taking a geography course at some grade from 9 through 12.
- However, students who had not taken a geography course did just as well as those who had.
- Much of the geography that is presented in the high-school curriculum occurs as a part of other courses such as Earth Science at grade 9, World History at grade 10, and U.S. History at grade 11.

Relationship Between Topic Studied and Performance

The NAEP assessment asked students to indicate how much they had studied the four geography topics either in a geography course or any other course. Students who had studied the topics "a lot" performed better in locational geography, were better able to use geographical skills and tools, and better understood the important aspects of physical geography. Studying "a lot" did not seem to make the same difference for cultural geography.

Topic Studied	Percent of Students	Average Percent Correct
Geographic Locations		
None or Very Little	17	54*
Some	54	57*
A Lot	29	63
Skills and Tools		
None or Very Little	28	49*
Some	53	53*
A Lot	19	58
Cultural Geography		
None or Very Little	51	60
Some	42	60
A Lot	7	62
Physical Geography		
None or Very Little	36	57*
Some	47	58*
A Lot	17	62

* Statistically significant difference from "a lot" group at the .05 level.

Background Factors

A variety of background factors were positively related with geographic proficiency. In particular, students knew more geography if they

- had well educated parents,
- had access to a variety of reading materials in their homes,
- had two or more parents or guardians, 1 or 2 siblings living in their homes,
- did more homework,
- watched less television, and
- worked less than 20 hours per week at a part-time job.

Background Factor	Average Proficiency
Parents Level of Education	
No High School Diploma	267
Graduated High School	284
Graduated College	305
Reading Materials In Home	
0-2 types	273
3 types	287
4 types	300
Parents Living at Home	
Both	297
One Parent	285
Neither	274
Number of Siblings	
0 sibling	289
1 sibling	299
2 siblings	298
3 siblings	291
4 or more siblings	285
Hours Spent on Homework Each Day	
None assigned	277
1 hour	294
2 hours	295
More than 2 hours	299
Hours of TV Watching Each Day	
0 - 2 Hours	300
3 - 5 Hours	289
6 or more hours	266
Hours Worked Per Week	
No Part time job	293
1 - 15 Hours	299
16 - 20 Hours	294
21 - 30 Hours	288
31 or More hours	283

THE NATION'S REPORT CARD naep

THE NATIONAL
ASSESSMENT OF
EDUCATIONAL
PROGRESS

PO BOX 6710 · PRINCETON NEW JERSEY 08541 - 6710
TELEPHONE 800 · 223 · 0267

REMARKS PREPARED FOR DELIVERY AT NEWS CONFERENCE REGARDING NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

The Geography Learning of High-School Seniors

Ina V. S. Mullis
Deputy Director, NAEP
Educational Testing Service

National Press Club
Washington, D.C.

February 7, 1990

EDUCATIONAL TESTING SERVICE

INTRODUCTION

Our children are growing up in a world increasingly interdependent economically, where instant global communications shrink distances. Each of us has, in our mind's eye, a picture of the world, whereby we place the cities and countries highlighted in discussions of national and world events. For example, the Brazilian rain forest, the Berlin wall, and where the U.S. troops went when they were sent to Panama.

But when asked questions based on the "mental map" of their world, large numbers of our high-school seniors drew a blank.

Let me illustrate this serious national concern with the geography findings NAEP is issuing today.

LOCATION AND PLACE

Stimulated by the concerted efforts of the National Geographic Society, including the Gallup Polls leading up to this NAEP geography assessment, there has been considerable concern expressed about students' ignorance of where places are located. A growing national awareness of students' lack of basic understanding in this area is evident and can be seen from Doonesbury and prime time television to high level debates about educational reform.

The NAEP results for high-school seniors tend to support this general perception of students' feeble geography skills. In fact, in addition to asking parents if they know where their children are...we might begin asking children, if they themselves know where *they* are.

Students were most successful when asked to locate major countries. For example, 85 percent recognized the Soviet Union on a world map. However, these twelfth graders had much more difficulty locating other places such as cities and physical land features including oceans, rivers, and mountains. For example, only 58 percent were able to identify Jerusalem on a regional map and only 50 percent knew the Panama Canal would cut sailing time between New York and San Francisco rather than, for example, from New York to London. What can students think and understand about recent events in these locations--the Middle East and Panama--that have featured so prominently in our country's current affairs?

As for their understanding of rivers and oceans, only about two-thirds of these students nearing high-school graduation recognized that the Mississippi River flows into the Gulf of Mexico. Almost 15 percent indicated that the Mississippi River flowed into the Atlantic Ocean, and more than 10 percent replied that it flowed into the Great Lakes. The question on oceans was the most difficult question of all. When given four choices, and asked to identify the order of the three oceans, moving east around the globe from Africa...only one-third of the high-school seniors could do so.

Finally, perhaps the most striking misconception: When given a dot map of population distribution showing Europe, India, China, and Japan virtually shaded in--almost one-quarter of the students indicated that the map represented abundant mineral deposits. Only half recognized the map represented population concentrations.

In addition to the questions designed to measure students' understanding of geography, the assessment included questions about how much students thought they had studied the geography topics covered in the assessment. Despite their poor performance on the questions about location, students reported more study in this area than in any other area of geography. Although only 29 percent reported "a lot" of study, over half reported some study of the location of continents, countries, states, cities, and various places.

GEOGRAPHIC SKILLS AND TOOLS

Twelfth graders reported somewhat less study across their school careers in the area of map-reading--the next most emphasized area of geographic study. Nineteen percent reported extensive study in this area, and 53 percent some study.

Although high-school seniors appear to have basic map-reading abilities, such as how to interpret symbols and understanding direction, less than two-thirds of the students demonstrated that they were familiar with the concepts of latitude and longitude. For example, 58 percent were able to look at a map and identify the two cities with similar longitude. Nearly 20 percent instead identified the cities with similar latitude. Further evidence about students' confusion between latitude and longitude was obtained on a question about the prime meridian being at 0 degrees longitude. Only 55 percent answered this question correctly, with about one-third of the students identifying 0 degrees longitude as the equator.

High-school seniors seem not to understand that maps can be used for many purposes beyond simple locational information. They had difficulty when asked to make inferences or interpretations based on the information presented in a single map and particular difficulty synthesizing information across maps. For example, when given two maps of the same area--one showing amount of rainfall and the other showing elevation--only 27 percent of the students could put the two sets of information together to identify areas of likely soil erosion.

This finding is consistent with the results obtained in NAEP assessments of other curriculum areas, which show students' critical thinking skills to be generally weak across all school subjects.

CULTURAL GEOGRAPHY

Students reported the least study of cultural geography topics. Over half--51 percent--reported no or little study of these topics.

Most twelfth-graders, however, did demonstrate an awareness of environmental issues addressed in the news. For example, 79 percent appeared to understand the primary way to control acid rain and 69 percent identified a risk to the environment resulting from the use of pesticides.

Given the vital importance of these and other environmental issues--it is discouraging, however, that so few seemed to understand these issues in depth. For example, only 59 percent recognized the consequences of cutting down the rain forests, only 53 percent identified a cause of the greenhouse effect, and less than half--41 percent--recognized that thermonuclear warfare would effect the environment. Not withstanding public discussion, these students are apparently unfamiliar with the implications of the so-called nuclear winter.

Given that such issues as climate, depletion of the ozone layer, pollution of oceans and fresh waters, loss of tropical forests, acid rain, toxic chemicals and hazardous waste should be moving to the top of the world's agenda, it seems legitimate to ask whether these high-school seniors are capable of contributing to an effort to preserve our planet.

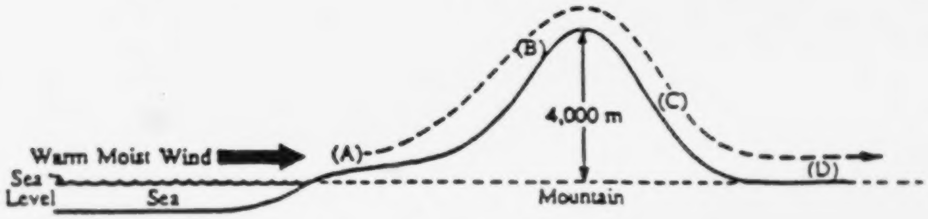
PHYSICAL GEOGRAPHY

Students also had limited success with the questions about climate, weather, tectonics, and erosion.

Only about two-thirds--68 percent--knew the cause of the earth's seasons.

On a very basic question in the area of tectonics, these twelfth-graders were shown a simple cross-sectional drawing depicting a sharp fracture in the earth's crust. Only 60 percent recognized evidence of faulting in this diagram. One wonders how well our high-school seniors understood the recent events of the San Francisco earthquake.

Finally, on another question tapping their knowledge of how rain occurs, students were asked the following question.



Which of the following lettered regions shown in the diagram above would have the greatest annual precipitation?

A A

[✓ B] B

C C

D D

Less than half, 43 percent, knew that rain would be more likely to occur on the windward side of a coastal mountain. Thirty percent thought the most rainfall would occur right by the water at point (A) and the remaining students misunderstood on which side of the mountain rain occurs.

In summary, the high-school seniors demonstrated generally low performance across all four areas emphasized in the assessment--location and place, skills and tools, cultural geography, and physical geography. To lend context to the performance results, as mentioned previously, the assessment also included a series of background questions about students' study of geography.

GEOGRAPHY COURSE-TAKING

As indicated by students' reports of their study of the geography topics included in the assessment, geography study is not prominent in students' school experience. On average, less than one-third of the students reported sizable amount of study of the topics covered in the assessment. Thus, it is not surprising that when asked about their geography coursework less than two-thirds--64 percent--reported any type of geography coursework. Based on the choices students were given, which included both World and U.S. History, because some states include geography in their history curricula, and Earth Science as a course that includes content related to physical geography, this may be a very generous view of their geography course experience.

Much of the high-school geography coursework reported by students did occur in these other courses. Also, students reported the most coursework in ninth grade. Thus, it also may not be surprising that geography coursework *per se* was not related to better performance on the assessment and that this was generally consistent across various subpopulations of students. That is, within subpopulations of students as defined by race/ethnicity, gender, region of the country, and high-school program, students who reported geography coursework tended to do no better on the assessment than those who reported not taking geography.

What is interesting, is that when asked about studying the various topics included in the assessment--students who reported more study of the topics tended to perform better on those types of questions. That is, students who reported more study of the location of foreign countries, states, cities, and rivers did better on the location questions than students who reported less study and students who reported studying geography skills--such as reading the symbols on maps and globes and using scales to measure distance--outperformed students who reported less study of these topics. Although this pattern was also found for the physical geography questions, it was not found in the area of cultural geography--probably because of the low incidence of study in that area. On average, only 7 percent of the students reported much study of cultural geography.

Thus, even though there was not a relationship between geography coursework *per se*, as reported by students, and performance on the assessment, there was a relationship between the extent to which students had studied the topics in the assessment and their performance. This interesting juxtaposition of findings suggests that students don't study the topics covered in the assessment in their geography courses and raises the question of what topics *are* studied in geography courses.

DEMOGRAPHICS

There were notable differences in performance for students belonging to particular demographic groups. For example, males tended to outperform females in each of the four areas of geographic study included in the assessment. Although, the differences were not large, they were pervasive. These differences are of concern, aligning the findings in geography with those in mathematics and science--two subjects well noted for large performance differences favoring males.

The results by race/ethnicity were equally consistent. For each of the four areas, White students tended to outperform Hispanic students, who in turn tended to outperform Black students, although the gap between White and Hispanic students tended to be larger than the gap between Hispanic and Black students.

Results across the regions also showed consistency. For each area of the assessment, the performance of students from the central, northeast, and western regions was remarkably similar and that of the students in the Southeast lagged behind by about 5 percentage points.

Consistent with findings in other NAEP subject area assessments and other research, the students who performed best on the assessment appeared to have an academic orientation. They were enrolled in academic rather than general or vocational/technical high school programs and reported doing at least two hours of homework and reading at least 16 pages for their schoolwork each day. However, it is worth noting that students in vocational/technical programs were more likely to take geography coursework than their counterparts in other high-school programs.

Finally, in keeping with findings from previous assessments, students who watched moderate amounts of television and who didn't have part-time jobs or only worked in moderation had higher geography achievement. Those students who reported watching television two hours or less each day outperformed their classmates who reported more excessive viewing. While the 27 percent of students who reported working 1 to 15 hours a week tended to outperform their non-working peers, the performance of nonworkers and those who reported working 16 to 20 hours a week was quite similar. Only when students piled on the hours--to more than 20 a week--was there a noticeable drop in performance.

* *

This overview of findings from NAEP's 1988 geography assessment of high-school seniors highlights the geography content covered by the 76 questions included in the survey. The findings are based on responses obtained from January through May of the 1987-88 school year from a nationally representative, scientific sample of more than 3,000 twelfth-grade students in approximately 300 public and private schools across the nation.

young children and elementary school students to teach them about the world in which they live.

For example, parents can encourage children to think about where they live, how to get to places they go and teach them simple geographic and locational terms, such as points of the compass, and right, left, up, down, and so forth.

Parents should introduce their children to maps and encourage them to help plan family trips to relatives and friends. Watching weather forecasts together and reading about other cultures and countries helps children become aware of the interrelatedness and diversity of geographical phenomena. Having a globe or world map handy when watching the news or television shows can provide a lesson in where places are when children hear or see them on the screen. These are just a few of the suggestions contained in Helping Your Child Learn Geography. There are many more, practical activities for parents to use in teaching their children about geography.

If we begin early with activities like those suggested in our recent publication we will have better results the next time geography is assessed. More importantly, we will have students and adults who know what is where and why things are happening in the world around them.

Thank you. Now I would like to turn the program over to the technical experts to present the results of the Geography Assessment of High School Seniors.

Remarks by Gilbert M. Grosvenor
on Results of NAEP Survey on Geography
WEDNESDAY, FEBRUARY 7, 1990
NATIONAL PRESS CLUB
WASHINGTON, D.C.

THANK YOU. IT'S A PLEASURE TO SHARE WITH YOU TODAY THIS ASSESSMENT OF GEOGRAPHIC KNOWLEDGE.

WE AT THE NATIONAL GEOGRAPHIC SOCIETY ARE IMPRESSED WITH THIS SURVEY BY THE NATIONAL ASSESSMENT FOR EDUCATIONAL PROGRESS, THE DEPARTMENT OF EDUCATION AND THE EDUCATIONAL TESTING SERVICE. AND TO ALL OF YOU OUR PROFOUND THANKS FOR YOUR EXHAUSTIVE EFFORTS; IT PROVIDES US WITH THE MOST SIGNIFICANT DOCUMENTATION YET OF WHAT OUR YOUNGSTERS KNOW -- AND DON'T KNOW -- AS THEY PREPARE TO BECOME NATIONAL AND GLOBAL CITIZENS.

SOME OF THE RESULTS ARE ENCOURAGING, BUT MOST ARE DISTURBING AND CONFIRM WHAT WE ALREADY KNOW: AN UNACCEPTABLY HIGH PERCENTAGE OF AMERICAN HIGH SCHOOL GRADUATES HAVE NOT LEARNED GEOGRAPHY.

IN FACT, IN THE FOUR AREAS TESTED --LOCATION; SKILLS/TOOLS; CULTURAL GEOGRAPHY; AND PHYSICAL GEOGRAPHY -- THE HIGHEST PERCENTAGE CORRECT WAS 59 PERCENT.

AS SUBSTANDARD AS THAT IS, IT SHOULDN'T SURPRISE ANYONE

BECAUSE GEOGRAPHY IS SIMPLY NOT BEING TAUGHT IN MANY SCHOOL DISTRICTS. WHERE IT IS TAUGHT, ALL TO OFTEN THE INSTRUCTION IS POOR BECAUSE THE TEACHER LACKS EXPERTISE OR THE SCHOOL LACKS RESOURCES.

WHAT IS SO DISTURBING IS THAT GEOGRAPHY COULD BE AND SHOULD BE THE MOST INTERESTING SUBJECT IN THE CURRICULUM. THE DISCIPLINE COMBINES HARD SCIENTIFIC DATA WITH FASCINATING OBSERVATIONS AND INTERACTIONS WITH PEOPLE OF DIFFERENT CULTURES. GEOGRAPHY MOTIVATES US TO LOOK AT OUR PAST, STUDY THE PRESENT, AND TO PREDICT THE FUTURE. WE CAN DETERMINE WHERE THINGS ARE, WHY THEY ARE THERE AND WHERE THEY'RE HEADED FROM HERE.

EVER SINCE WE FIRST HAD A HINT THAT OUR YOUNGSTERS WERE GEOGRAPHICALLY ILLITERATE, THE NATIONAL GEOGRAPHIC SOCIETY HAS SPEARHEADED AN EFFORT TO WAKE KIDS UP TO THE WONDERS AND EXCITEMENT OF GEOGRAPHY. THE SOCIETY'S SECOND PRESIDENT ALEXANDER GRAHAM BELL, DESCRIBED GEOGRAPHY AS "THE WORLD AND ALL THAT IS IN IT."

TO STIMULATE THINKING AND TO CHANGE PUBLIC POLICY IS A MONUMENTAL CHALLENGE. THE TASK IS LONG TERM AND EXPENSIVE. THE

NATIONAL GEOGRAPHIC COMMITS $5 MILLION A YEAR TO TEACHER TRAINING, DEVELOPING NEW CLASSROOM TECHNOLOGIES, AND RESTORING GEOGRAPHY TO THE CURRICULUM. WE MUST EXCITE STUDENTS WHO ARE TURNED OFF ABOUT THE WORLD AROUND THEM. IN ADDITION -- ON JANUARY 13, 1988 -- THE DATE OF OUR CENTENNIAL -- THE SOCIETY'S BOARD IDENTIFIED GEOGRAPHY EDUCATION AND THE ENVIRONMENT AS CRITICAL AREAS OF FUTURE FUNDING. TO FULFILL THIS MISSION, WE INITIALLY COMMITTED $20 MILLION TO SET UP THE NGS EDUCATION FOUNDATION AND WE WILL MATCH ANOTHER $20 MILLION.

OUR GOAL: TO BRING AMERICANS UP TO WORLD PARITY IN GEOGRAPHICAL KNOWLEDGE. WE MUST PROVIDE STUDENTS WITH THE CRITICAL THINKING SKILLS NECESSARY TO BECOME INFORMED, PRODUCTIVE CITIZENS OF THE WORLD. BUT LIKE MATH, GEOGRAPHY REQUIRES BASIC SKILLS BEFORE YOU CAN BEGIN SOLVING THE MUCH LARGER AND MORE COMPLICATED PROBLEMS THAT TODAY'S WORLD CONFRONTS IN ECONOMICS, DIPLOMACY AND THE ENVIRONMENT.

TO REACH OUR GOAL WILL TAKE YEARS, BUT WE MUST START NOW.

I URGE ALL TEACHERS TO INCORPORATE GEOGRAPHY INTO THEIR

CURRICULUM. EVERY SUBJECT CAN AND SHOULD INCLUDE GEOGRAPHY.

FOR INSTANCE:

- ENGLISH. HOW CAN YOU REALLY UNDERSTAND "THE TALE OF TWO CITIES" IF YOU DON'T KNOW THE RELATIONSHIP BETWEEN LONDON AND PARIS, THE SIGNIFICANCE OF THE ENGLISH CHANNEL. CHARLES DICKENS USED THE GEOGRPAHY OF EUROPE TO WARN THE BRITISH OF WHAT COULD HAPPEN TO THEM!
- MATHEMATICS. WHILE TEACHING PERCENTAGES, PREDICT THE YEAR IN WHICH THE MOSLEMS COULD BECOME THE MAJORITY POPULATION IN THE U.S.S.R. USING CURRENT 6% GROWTH RATE, THAT OCCURS IN 2050 - DURING THE LIFETIME OF TODAY'S PRIMARY SCHOOL STUDENTS.
- CIVICS. HOW ABOUT LESSONS OF CENSUS SHIFTS IN THE SOUTH AND WEST REFLECTING INFLUX OF HISPANIC AND ASIAN AMERICANS. BETTER YET, TEACH GLOBAL CIVICS INCLUDING ENVIRONMENTAL RESPONSIBILITY.
- SCIENCE. TEACH GLOBAL IMPACT OF COUNTRIES WHICH HAVE

> RENEWABLE RESOURCES, POTENTIAL POPULATION IMBALANCES, SUSCEPTIBILITY TO EARTHQUAKES, DESERTIFICATION AND THE SIGNIFICANCE OF TROPICAL FORESTS?

THE ILLUSTRATIONS ARE ENDLESS.

GEOGRAPHY IS THE FABRIC UPON WHICH THE TAPESTRY OF PLANET EARTH IS WOVEN. RECENTLY I WAS HEARTENED THAT SECRETARY OF EDUCATION CAVAZOS MENTIONED GEOGRAPHY ALONG WITH READING, MATH, SCIENCE AND WORLD HISTORY AS SUBJECTS TO BE MASTERED PRIOR TO HIGH SCHOOL GRADUATION. ON BEHALF OF GEOGRAPHY, THANK YOU, MR. SECRETARY. PLEASE TAKE THIS MESSAGE TO PRESIDENT BUSH, IF YOU WOULD: NATIONAL GEOGRAPHIC AND THE ENTIRE GEOGRAPHY COMMUNITY ARE READY, WILLING AND ABLE TO HELP HIM ACHIEVE HIS EDUCATION GOALS. NATIONAL VISIBILITY IS VITAL IF WE ARE TO OBTAIN OUR GOAL.

ONLY PRESIDENTIAL LEADERSHIP WILL SPARK A GRASSROOTS PRAIRIE FIRE ACROSS AMERICA. WE MUST MOBILIZE PARENTS, SCHOOL BOARDS, TEACHERS AND SCHOOL ADMINISTRATORS TO WORK TOGETHER. SINCE 93% OF THE NATION'S PUBLIC EDUCATION BUDGET EMANATES FROM STATE CAPITOLS

INSTITUTIONAL CHANGES WILL OCCUR AT STATE AND LOCAL SCHOOL DISTRICTS.

OUR NATION'S GOVERNORS HAVE DISCOVERED GEOGRAPHY AND INTERNATIONAL STUDIES. FORMER GOVERNORS LAMAR ALEXANDER OF TENNESSEE, GERALD BALILES OF VIRGINIA, BOB ORR OF INDIANA, TOM KEENE OF NEW JERSEY, TO NAME A FEW, PLUS CURRENT GOVERNORS TERRY BRANSTAD OF IOWA, RAY MABUS OF MISSISSIPPI, CARROLL CAMPBELL OF SOUTH CAROLINA, AND BILL CLINTON OF ARKANSAS.

- THEY HAVE LED OUR EFFORT TO FORGE GEOGRAPHIC ALLIANCES IN 34 STATES. THESE ARE NETWORKS OF PROFESSIONAL GEOGRAPHERS, TEACHERS AND CITIZENS WHO CONTRIBUTE THOUSANDS OF HOURS A YEAR TO THEIR LOCAL COMMUNITIES AND STATES.
- WE HAVE CONDUCTED INTENSIVE TEACHER TRAINING SESSIONS FOR 2,000 TEACHERS OVER THE PAST FOUR YEARS. THEY IN TURN HAVE TRAINTED 40,000 TEACHERS, WHO HAVE TAUGHT 6 MILLION YOUNGSTERS.
- LAST WEEK, OUR SECOND ANNUAL NATIONAL GEOGRAPHY BEE BEGAN. SOME 31,000 SCHOOLS WILL HOST 3-4 MILLION YOUNGSTERS IN GRADES

4-8 WHO WILL COMPETE FOR $50,000 IN COLLEGE SCHOLARSHIPS. STATE FINALISTS MEET MAY 23-24 AT SOCIETY HEADQUARTERS. TWO FINE CORPORATIONS, AMTRAK AND M & M/MARS ARE HELPING MAKE THIS YEAR'S BEE REACH MORE YOUNGSTERS.

- IN JUST TWO YEARS OUR FOUNDATION HAS GROWN TO $30 MILLION. COMPANIES SUCH AS BELL ATLANTIC, RIGGS NATIONAL BANK, SOUTHWESTERN BELL, AND WESTVACO HAVE CONTRIBUTED GENEROUSLY. FOUNDATIONS SUCH AS KELLOGG, PHIL HARDIN AND SID RICHARDSON ALSO HAVE GIVEN OUTSTANDING SUPPORT, AS WELL AS THE KIWANIS CLUBS OF FLORIDA.
- CITICORP'S SPONSORSHIP OF LAST YEAR'S "GEOGRAPHY AWARENESS WEEK" ALLOWED US TO SEND LESSON PLAN KITS ON THE ENVIRONMENT TO 100,000 TEACHERS THROUGHOUT THE COUNTRY, AS WELL AS TO HOLD A STUDENT ENVIRONMENTAL SUMMIT WITH EPA ADMINISTRATOR REILLY, SENATOR GORE AND OTHERS.
- MORE ENCOURAGING NEWS: THE UNIVERSITY OF TENNESSEE AND THE UNIVERSITY OF COLORADO HAVE MADE GEOGRAPHY OR WORLD HISTORY A REQUIRED COURSE PRIOR TO ADMISSION. THIS OF COURSE,

REQUIRES RESTORING GEOGRAPHY TO HIGH SCHOOLS. I BELIEVE OTHER UNIVERSITIES WILL FOLLOW SUIT, AND IF THEY DO, THAT WILL HELP THE SITUATION AND THEMSELVES IMMENSELY.

AS RECENT EVENTS IN MOSCOW, PRETORIA, BEIJING AND EASTERN EUROPE HAVE SHOWN, IT IS AS DIFFICULT AS IT'S EVER BEEN TO PREDICT WHAT'S IN STORE IN TODAY'S FLUID WORLD.

ONE THING IS CERTAIN: WE MUST PREPARE THOSE GRADUATING FROM OUR HIGH SCHOOLS TO MEET THE CHALLENGES OF TOMORROW'S WORLD. WE MUST BEGIN NOW TO GIVE THEM THE KNOWLEDGE THEY NEED TO IMPROVE UPON A WORLD THEY WILL ALL TOO SOON INHERIT AND GOVERN.

WE ARE REACHING OUT TO PUBLIC AND PRIVATE CITIZENS ALIKE IN THIS CRUSADE TO PREPARE ALL OF OUR CHILDREN TO PLAY A SIGNIFICANT ROLE IN A RAPIDLY CHANGING WORLD.